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The genus *Brachistosternus* (Scorpiones: Bothriuridae) in Chile, with Descriptions of Two New Species

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ABSTRACT

We review the taxonomy of the *Brachistosternus* Pocock, 1893 scorpions of Chile, providing revised diagnoses, comprehensive distribution maps (based on all known locality records), and an illustrated key to all Chilean species of the genus. Two new species, *Brachistosternus* (*Leptosternus*) *chango*, n.sp., and *Brachistosternus* (*Leptosternus*) *kamanchaca*, n.sp., are described from northern Chile. The phylogenetic affinities of *B. chango* are unclear. Some characters suggest that this species may be related to *Brachistosternus* (*L.*) *artigasi* Cekalovic, 1974 but others suggest that it may be related to *Brachistosternus* (*L.*) *roigalsinai* Ojanguren Affilastro, 2002. *Brachistosternus kamanchaca*, in contrast, appears to be closely related to *Brachistosternus* (*L.*) *donosoi* Cekalovic, 1974 and other species from the plains of northern Chile and southern Perú.

RESUMEN

Se revisa la taxonomía de los escorpiones del género *Brachistosternus* Pocock, 1893 de Chile, se brindan diagnosis revisadas, mapas de distribución completos (basados en todos los registros conocidos) y una clave ilustrada de todas las especies. Se describe a *Brachistosternus* (*Leptosternus*) *chango*, n.sp., y a *Brachistosternus* (*Leptosternus*) *kamanchaca*, n.sp., del norte de Chile. Las relaciones filogenéticas de *B. chango* son poco claras. Algunos caracteres de esta especie sugieren que puede estar relacionada con *Brachistosternus* (*L.*) *artigasi* Cekalovic, 1974, aunque otros parecerían relacionarla con *Brachistosternus* (*L.*) *roigalsinai* Ojanguren Affilastro, 2002. *Brachistosternus kamanchaca* por otro lado, se encuentra estrechamente relacionada con

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Brachistosternus (*L.*) *donosoi* Cekalovic, 1974, así como con otras especies de llanura del norte de Chile y sur del Perú.

INTRODUCTION

Although the scorpion fauna of Chile is among the most diverse in South America, it received little attention until recent years. *Brachistosternus* Pocock, 1893, the most diverse genus in the country, comprises numerous extremely range-restricted and microhabitat-specific species, many of which have been described in the past 5 years (Ochoa, 2002; Ochoa and Acosta, 2002; Ojanguren Affilastro, 2002b, 2004b, 2005a; Agusto et al., in press).

During recent fieldwork in central and northern Chile, we collected several undescribed species of *Brachistosternus*, two of which, *Brachistosternus chango*, n.sp., and *Brachistosternus kamanchaca*, n.sp., are described below. The description of these species raises the number of species in the genus to 38 (table 1). *Brachistosternus* is the second most speciose scorpion genus in South America, after *Tityus* C.L. Koch, 1836 (Buthidae C.L. Koch, 1837; Fet and Lowe, 2000), and has evidently undergone a radiation similar to the mostly fossorial genera *Opistophthalmus* C.L. Koch, 1837 (Scorpionidae Latreille, 1802), *Urodacus* Peters, 1861 (Urodacidae Pocock, 1893), and *Paruroctonus* Werner, 1934 (Vaejovidae Thorell, 1876) in the arid zones of southern Africa, Australia, and North America, respectively. Presumably, the radiation of *Brachistosternus*, like those of *Opistophthalmus*, *Urodacus*, and *Paruroctonus*, can in large part be explained as a consequence of allopatric speciation promoted by stenotopic substratum requirements (Prendini, 2001).

The patterns of distribution and diversity observed among the *Brachistosternus* species inhabiting the arid to semi-arid regions of Chile contrast starkly with those among species inhabiting the arid plains of Argentina, most of which are widely distributed and somewhat less microhabitat specific (Maury, 1974; Roig Alsina and Maury, 1981, 1984; Ojanguren Affilastro, 2001, 2002a, 2002b, 2003a, 2004a, 2005b, Ojanguren Affilastro and Roig Alsina, 2001). This observation is somewhat paradoxical because most of the Chilean *Brachistosternus* species appear to be closely related to those from Argentina. However, the *Brachistosternus* species from the central arid areas (Coquimbo Region) of Chile appear to be more closely related to the Andean species of the genus, most of which are also very range restricted and microhabitat specific.

Of the two new species described in the present contribution, *B. kamanchaca* is among the most widespread Chilean species of the genus, occupying most of the Atacama Region and probably part of the neighboring Antofagasta and Coquimbo Regions. In contrast, *B. chango* is known from only two localities.

Several poorly known Chilean species of *Brachistosternus* were also collected during our fieldwork in central and northern Chile. We take the opportunity to report new records and observations for these species in the present contribution, as well as providing revised diagnoses, comprehensive distribution maps (based on all known locality records), and an illustrated key for all Chilean species of the genus.

MATERIALS AND METHODS

Descriptive terminology follows Maury (1974) for the hemispermatophores (figs. 27 and 30); Vachon (1974) for the trichobothria; Cekalovic (1973) for the androvestigia (a pair of glands situated on the dorsal surface of metasomal segment V in the adult male); Roig Alsina and Maury (1981) for the male telson gland; Stahnke (1970) for the metasomal carinae, abbreviated as follows: DL: dorsolateral, LIM: lateral inframedian, LSM: lateral supramedian, PL: paramedian, PM: paralateral, VL: ventrolateral, VSM: ventrosubmedian, and VM: ventromedian; and Francke (1977) for the pedipalpal carinae, abbreviated as follows: DI: dorsal internal, DE: dorsal external, and VI: ventral internal. Abbreviations of collections from which material was studied are as follows: AMNH: American Museum of Natural History, New York; ARA: Arturo Roig Alsina personal collection, Buenos Aires, Argentina; CDA:

Cátedra de Diversidad Animal I, Universidad de Córdoba, Argentina; LEULS: Laboratorio de Entomología, Universidad de La Serena, Chile; MACN-Ar: Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia', National Arachnological Collection, Argentina; MNHN: Museum National DHistoire Naturelle, Paris, France; MUSM: Museo de historia Natural, Universidad Nacional Mayor de San Carlos, Lima, Perú; MZUC: Museo Zoológico del Instituto de Biología de la Universidad de Concepción, Chile; and ZMH: Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Germany. Scorpion tissue samples are stored (in the vapor phase of liquid nitrogen at −150°C) in the Ambrose Monell Collection for Molecular and Microbial Research (AMCC) at the AMNH. Illustrations were produced using a Leitz Wetzlar stereomicroscope and camera lucida. Measurements, taken using an ocular micrometer, are recorded in millimeters. Hemispermatophores were dissected from surrounding tissues and observed in 80% ethanol. Distribution maps were generated using ArcMap 9.0 (Enviromental Systems Research Institute [ESRI], Redlands, California), by superimposing the point locality records of species on coverages depicting the political boundaries and topography of Chile. The topographic coverage was generated from a digital elevation model file (1 arc degree resolution) from the United States Geological Survey (USGS) website (http://edcdaac.usgs.gov:80/gtopo30/gtopo30.asp). Point locality records were georeferenced in the field with a portable Global Positioning System (Garmin® Etrex and Garmin® II) or retrospectively using the GeoNet Names Server (GNS, http://gnswww.nga.mil/geonames/GNS/index.jsp).

SYSTEMATICS

FAMILY BOTHRIURIDAE SIMON, 1880

GENUS *BRACHISTOSTERNUS* POCOCK, 1893

KEY TO IDENTIFICATION OF THE CHILEAN SPECIES OF *BRACHISTOSTERNUS* POCOCK, 1893:

1. Pedipalp patella with 5–7 ventral trichobothria (fig. 42); hemispermatophore, cylindrical apophysis dorsoventrally compressed (fig. 36) *Brachistosternus* (*Brachistosternus*) *ehrenbergii*
– Pedipalp patella with 3 ventral trichobothria (fig. 43); hemispermatophore, cylindrical apophysis terete (figs. 1, 28, 37–41) . . . . . *Brachistosternus* (*Leptosternus*) . . . 2
2. Basitarsi I and II, prolateral pedal spurs vestigial or absent (fig. 52); hemispermatophore, internal structures absent 3
– Basitarsi I, prolateral pedal spur well developed, equal to retrolateral pedal spur (fig. 53); hemispermatophore, internal structures well developed. 4
3. Metasomal segment V, VM carina present in posterior half of segment; androvestigia absent. . . . . *Brachistosternus* (*L.*) *sciosciae*
– Metasomal segment V, VM carina extending entire length of segment; androvestigia present, small . . . . . *Brachistosternus* sp. 1
4. Pedipalp femur with two macrosetae associated with *d* and *e* trichobothria (fig. 8) 5
– Pedipalp femur with one macroseta associated with *d* and *e* trichobothria (fig. 9) 6
5. Metasomal segments I–IV, ventral surface with pair of VSM stripes; segment V, androvestigia (male) very large, occupying >50% of dorsal surface (fig. 4) . . . . . *Brachistosternus* (*L.*) *chango*, n.sp.
– Metasomal segments I–IV, ventral surface with single VM stripe; segment V, androvestigia medium-sized, occupying <50% of dorsal surface (fig. 46) . . . . . *Brachistosternus* (*L.*) *artigasi*
6. Metasomal segment V, VM carina conspicuously elevated, extending entire length of segment; androvestigia very large, occupying >50% of dorsal surface; hemispermatophore, distal lobe elongated (fig. 37) . . . . . *Brachistosternus* (*L.*) *roigalsinai*
– Metasomal segment V, VM carina, if present, not conspicuously elevated, seldom extending entire length of segment; androvestigia small to medium-sized, occupying <50% of dorsal surface (figs. 31, 49); hemispermatophore, distal lobe not elongated (fig. 28) 7
7. Metasomal segments I–IV, ventral surface with pair of VSM stripes (fig. 54). 8
– Metasomal segments I–IV, ventral surface unpigmented or with single VM stripe (figs. 55, 56) 9
8 Metasomal segment V, VM carina extending entire length of segment (fig. 45). . . . . *Brachistosternus* (*L.*) *cekalovici*
– Metasomal segment V, VM carina absent. . . . . *Brachistosternus* (*L.*) *negrei*
9. Metasomal segment IV densely granular (male) (fig. 47), slightly granular (female); segment V, androvestigia narrow and elongated

(fig. 49); hemispermatophore, internal spines well developed (fig. 40) 10
– Metasomal segment IV smooth or slightly granular (male) (fig. 48), smooth (female); segment V, androvestigia medium-sized (fig. 31); hemispermatophore, internal spines poorly developed (fig. 30) or absent (fig. 41) 11
10. Metasoma unpigmented, tergites unpigmented or with lateral margins faintly spotted; pedipalp chela, length/height ratio 2.9–3.11 (male), 3.13 (female) . . . . . *Brachistosternus* (*L.*) *mattonii*
– Metasomal segment V pigmented, with single VM and paired VL stripes ventrally, and two posterolateral and single antero-median spots dorsally; tergites I–VI densely pigmented, with transverse stripe extending most of segment; pedipalp chela, length/height ratio 3.25–3.6 (male), 3.02–3.21 (female) . . . . . *Brachistosternus* (*L.*) *ochoai*
11. Metasoma unpigmented; tergites unpigmented or with lateral margins faintly spotted . . . . . *Brachistosternus* (*L.*) *donosoi*
– Metasoma with single VM and pair of VL stripes, at least on segments III–V; tergites I–VI with transverse stripe or two to three dark spots 12
12. Metasomal segments I–IV, VM stripe very narrow, not joining VL stripes (fig. 56) . . . . . *Brachistosternus* (*L.*) *chilensis*
– Metasomal segments I–IV, VM stripe broad, joining VL stripes, at least on segment IV (fig. 55) 13
13. Metasomal segment V with 18 or more ventral macrosetae 14
– Metasomal segment V with 17 or fewer ventral macrosetae 15
14. Metasomal segment V, VM carina absent; telson gland well developed, divided into two separate halves (fig. 50) . . . . . *Brachistosternus* (*L.*) *perettii*
– Metasomal segment V, VM carina restricted to posterior half of segment; telson gland poorly developed, not divided into two separate halves. . . . . *Brachistosternus* (*L.*) *prendinii*
15. Metasomal segment V, VM carina absent . . . . . *Brachistosternus* sp. 2
– Metasomal segment V, VM carina present 16
16. Metasomal segment V, VM carina restricted to posterior half of segment (fig. 32); hemispermatophore, internal spines reduced to small group of granules (fig. 30) . . . . . *Brachistosternus* (*L.*) *kamanchaca*
– Metasomal segment V, VM carina extending entire length of segment; hemispermatophore, internal spines absent (fig. 41) . . 17
17. Metasomal segments I–III, VL and VM pigmentation stripes joining at posterior margin 18
– Metasomal segments I–III, VL and VM pigmentation stripes not joining at posterior margin 19
18. Pedipalp chela, length/width ratio 3.7–3.9 (male). . . . *Brachistosternus* (*L.*) *quiscapata*
– Pedipalp chela, length/width ratio 4.8–5.09 (male). . . . . *Brachistosternus* sp. 3
19. Metasomal segment V, length/width ratio 1.7–1.8 . . . . . *Brachistosternus* (*L.*) *piacentinii*
– Metasomal segment V, length/width ratio 1.8–1.95 . . . . . *Brachistosternus* (*L.*) *kovariki*

SUBGENUS *BRACHISTOSTERNUS* POCOCK, 1893

Brachistosternus (*B.*) *ehrenbergii* (Gervais, 1841)
figures 36, 42, 57

Scorpio ehrenbergii Gervais, 1841: 282.
Scorpio glaber Gervais, 1841: 285 (synonymized by Simon, 1880: 397).
Telegonus politus L. Koch, 1867: 234–235 (synonymized by Kraepelin, 1894: 216).
Brachistosternus (*Brachistosternus*) *ehrenbergii*: Lowe and Fet, 2000: 48 (complete reference list until 1998); Ochoa, 2002: 55; Ojanguren Affilastro, 2003a: 327–328, 2005b: 145–146; Ochoa, 2005: 51, 57.
Brachistosternus ehrenbergii: Prendini, 2000: 41; Soleglad and Fet, 2003a: 5, 2003b: 6; Acosta and Ochoa, 2002: 18; Prendini, 2003a: 154–156, 169, 2003b: 242; Ojanguren Affilastro, 2005a: 191; Prendini and Wheeler, 2005: 454.

TYPE MATERIAL: Syntypes (MNHN RS. 0615, RS.0616), **PERÚ**, Callao [12°04′S 77°09′W], M. Gaudichaud.

NEW RECORDS: **CHILE: Region I (Tarapacá):** *Arica Province*: Quebrada Vitor, 18°49′41.4″S 70°08′17.6″W, 17.i.2005, C. Mattoni, A. Ojanguren, and J. Ochoa, 435 m, 1 juv. (AMNH). *Iquique Province*: Quebrada Camarones, 2–10 km from coast, 19°10′48.1″S 70°13′46.8″W, 17.i.2005, 5–50 m, C. Mattoni, A. Ojanguren, and J. Ochoa, 1♀, 2 juv. (CDA), 6 juv. (MACN), 1♀, 7 juv. (AMNH), 1 juv. ♂, 1 juv. ♀ (AMCC 159656).

DIAGNOSIS: *Brachistosternus* (*B.*) *ehrenbergii* is the only Chilean species of subgenus *Brachistosternus* and may be distinguished from all other Chilean *Brachistosternus* species on the basis of its trichobothrial pattern, which exhibits five to seven ventral trichobo-

TABLE 1
The Described and Accepted Species of *Brachistosternus* Pocock, 1893 (Scorpiones: Bothriuridae), with Known Countries of Distribution

Subgenus *Brachistosternus* Pocock, 1893	
Brachistosternus (*B.*) *ehrenbergii* (Gervais, 1841)	Chile, Perú
Brachistosternus (*B.*) *pegnai* Cekalovic, 1969	Ecuador
Subgenus *Ministernus* Francke, 1985	
Brachistosternus (*M.*) *andinus* Chamberlin, 1916	Perú
Brachistosternus (*M.*) *ferrugineus* (Thorell, 1876)	Argentina, Bolivia, Brazil, Paraguay
Brachistosternus (*M.*) *peruvianus* Toledo Piza, 1974	Perú
Brachistosternus (*M.*) *simonae* Lourenço, 2000	Brazil
Subgenus *Leptosternus* Maury, 1973	
Brachistosternus (*L.*) *alienus* Lönnberg, 1898	Argentina
Brachistosternus (*L.*) *angustimanus* Ojanguren Affilastro & Roig Alsina, 2001	Argentina
Brachistosternus (*L.*) *artigasi* Cekalovic, 1974	Chile
Brachistosternus (*L.*) *castroi* Mello-Leitão, 1941	Chile
Brachistosternus (*L.*) *cekalovici* Ojanguren Affilastro, 2005	Chile
Brachistosternus (*L.*) *chango*, n.sp.	Chile
Brachistosternus (*L.*) *chilensis* Kraepelin, 1911	Chile
Brachistosternus (*L.*) *donosoi* Cekalovic, 1974	Chile
Brachistosternus (*L.*) *galianoae* Ojanguren Affilastro, 2002	Bolivia
Brachistosternus (*L.*) *intermedius* Lönnberg, 1902	Argentina, Bolivia
Brachistosternus (*L.*) *kamanchaca*, n.sp.	Chile
Brachistosternus (*L.*) *kovariki* Ojanguren Affilastro, 2003	Chile
Brachistosternus (*L.*) *mattonii* Ojanguren Affilastro, 2005	Chile
Brachistosternus (*L.*) *montanus* Roig Alsina, 1977	Argentina
Brachistosternus (*L.*) *multidentatus* Maury, 1984	Argentina
Brachistosternus (*L.*) *negrei* Cekalovic, 1975	Chile
Brachistosternus (*L.*) *ninapo* Ochoa, 2004	Perú
Brachistosternus (*L.*) *ochoai* Ojanguren Affilastro, 2004	Chile
Brachistosternus (*L.*) *paulae* Ojanguren Affilastro, 2003	Argentina
Brachistosternus (*L.*) *pentheri* Mello-Leitão, 1931	Argentina
Brachistosternus (*L.*) *perettii* Ojanguren Affilastro & Mattoni, 2006	Chile
Brachistosternus (*L.*) *piacentinii* Ojanguren Affilastro, 2003	Bolivia, Chile
Brachistosternus (*L.*) *prendinii* Ojanguren Affilastro, 2003	Chile
Brachistosternus (*L.*) *quiscapata* Ochoa & Acosta, 2002	Chile, Perú
Brachistosternus (*L.*) *roigalsinai* Ojanguren Affilastro, 2002	Chile
Brachistosternus (*L.*) *sciosciae* Ojanguren Affilastro, 2002	Chile
Brachistosternus (*L.*) *telteca* Ojanguren Affilastro, 2000	Argentina
Brachistosternus (*L.*) *titicaca* Ochoa & Acosta, 2002	Bolivia, Perú
Brachistosternus (*L.*) *turpuq* Ochoa, 2002	Perú
Brachistosternus (*L.*) *weijenberghi* (Thorell, 1876)	Argentina
Brachistosternus (*L.*) *zambrunoi* Ojanguren Affilastro, 2002	Argentina
Species not placed in a subgenus	
Brachistosternus holmberghi Carbonell, 1923	Argentina?

thria on the pedipalp patella (fig. 42). All other Chilean *Brachistosternus* species possess only three ventral trichobothria in this series (fig. 43). *Brachistosternus ehrenbergii* may also be distinguished from other Chilean species of the genus according to the shape of the cylindrical apophysis of the hemispermatophore, which is dorsoventrally flattened in *B. ehrenbergii* (fig. 36), but cylindrical in other Chilean species of the genus (figs. 1, 3, 28, 30,

37–41). The basal triangle of the hemispermatophore of *B. ehrenbergii* is more developed than those of other Chilean species of the genus. Only *B. roigalsinai* possesses a similarly elongated and sclerotized but less developed basal triangle. *Brachistosternus ehrenbergii* is the only *Brachistosternus* species known to possess a stridulatory organ, similar to that described by Acosta and Maury (1990) in *Timogenes* Simon, 1880, and formed by a small scattered group of granules on the medial surface of each pretergite. *Brachistosternus ehrenbergii* is the second largest bothriurid; specimens may reach up to 10 cm in total length. Only *Timogenes elegans* (Mello-Leitão, 1931) is slightly larger, some female specimens reaching about 12 cm (Ojanguren Affilastro, 2005b).

DISTRIBUTION: Although *B. ehrenbergii* has been reported from Argentina, Chile, Bolivia, Perú, and Ecuador, it is actually restricted to the Pacific desert of northern Chile and southern Perú (Ochoa, 2005; fig. 57).

NOTES: Gervais (1841) described two species in the same paper: *Scorpio ehrenbergii* and *S. glaber*. Simon (1880), the first revisor, established the synonymy of both names and selected the first as senior synonym. A detailed redescription with a revised synonymy of this species is in preparation by José Ochoa and the first author.

SUBGENUS *LEPTOSTERNUS* MAURY, 1973

Brachistosternus (*L.*) *artigasi* Cekalovic, 1974
figures 46, 58

Brachistosternus (*Leptosternus*) *artigasi* Cekalovic, 1974: 248–250; Ojanguren Affilastro, 2005a: 187.

Brachistosternus artigasi: Cekalovic and Artigas, 1981: 81; Cekalovic, 1983a: 54, 1983b: 188; Kovařík, 1998: 100; Lowe and Fet, 2000: 49; Ojanguren Affilastro, 2002b: 38, 2004b: 74, 2005a: 176, 178, 191.

TYPE MATERIAL: Holotype ♂ (MZUC 528), **CHILE: Region IV (Coquimbo):** *Elqui Province*: La Serena, Lomas de Peñuelas [29°54′S 71°15′W], 5.vii.1968, T. Cekalovic.

NEW RECORDS: **CHILE: Region IV (Coquimbo):** *Elqui Province*: Las Cardas [30°17′S 71°16′W], 1978, M. Moreno (pitfalls), 1♂, 1♀ (AMNH). *Limarí Province*: Parque Nacional Fray Jorge, upslope from campsite, 30°40′34.1″S 71°38′09.5″W, 4.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 167 m, UV detection, cold night, full moon, Matorral with bare gravelly patches, 3 juv. (AMCC 159657), 1♂ (AMCC 159658).

DIAGNOSIS: *Brachistosternus artigasi* is closely related to *B. chango*. These are the only species of the genus that possess two macrosetae associated with the *d* and *e* trichobothria of the pedipalp femur (fig. 8). Both species display the typical trichobothrial pattern of subgenus *Leptosternus*. Their hemispermatophores are also similar: The distal lamina is equal to or slightly shorter than the basal portion, the internal spines are absent, the basal spines and row of spines are well developed, and the basal triangle is medium-sized. The VM carina of metasomal segment V extends the entire length of the segment in both species.

The two species may be separated from one another as follows. *Brachistosternus chango* exhibits larger androvestigia, almost twice the size of those exhibited by *B. artigasi* (figs. 4, 46). The two species may also be distinguished on the basis of pigmentation pattern. *Brachistosternus chango* possesses paired VSM and VL stripes on metasomal segments I–IV, whereas *B. artigasi* possesses a single VM and paired VL stripes. Telson glands are absent in *B. chango*, but well developed in *B. artigasi*.

Brachistosternus artigasi occurs in sympatry with *B. cekalovici*. However, the two species may be separated by means of the pigmentation pattern of metasomal segments I–IV, which display paired VSM and VL stripes in *B. cekalovici*, compared with a broad, faint VM stripe and paired VL stripes in *B. artigasi*. They may also be distinguished on the basis of setation. *Brachistosternus artigasi* possesses two macrosetae associated with the *d* and *e* trichobothria of the pedipalp femur, whereas *B. cekalovici* possesses only one.

DISTRIBUTION: This species inhabits the Pacific coastline, in Coquimbo Province, central Chile (fig. 58). All localities where it has been collected fall within the Matorral Estepario botanical subregion, of the Matorral y Bosque Esclerófilo botanical region (Gajardo, 1993).

NOTES: See Ojanguren Affilastro (2005a) for a redescription of this species.

Brachistosternus (*L.*) *cekalovici* Ojanguren Affilastro, 2005
figures 45, 60

Brachistosternus (*L.*) *cekalovici* Ojanguren Affilastro, 2005a: 175–192.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10243), **CHILE: Region IV (Coquimbo):** *Elqui Province*: Tres Cruces [29°22′24″S 70°56′02″W], January 10, 1984, E. Maury.

NEW RECORDS: **CHILE: Region IV (Coquimbo):** *Choapa Province*: Playa Amarilla, 31°51′36.03″S 71°30′31.55″W, 3.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 10 m, UV detection, cool, humid night, cloud cover (fairly dark), light sea breeze off Pacific, coastal Matorral, semi-degraded coastal sand dunes on south-facing side of rocky ridge, 1♀, 1 juv. (CDA), 2♂, 1♀ (AMNH), 22 juv. (AMCC 159659), 1 juv. (AMCC 159660). *Elqui Province*: Punta Teatinos, ca. 10 km N La Serena, 29°49′20.28″S 71°17′23.49″ W, 7.xi.2003, L. Prendini, C. Mattoni, J. Ochoa, J. Pizarro, and P. Agusto, 0 m, UV detection, cool, still night, full moon, high humidity near beach, sand dunes behind beach, scattered grasses and forbs, 2 juv. (CDA), 3♂, 5♀, 6 juv. (AMNH), 9 juv. (AMCC 159661).

DIAGNOSIS: *Brachistosternus cekalovici* is closely related to *B. negrei*. The two species share the following combination of characters. Carapace densely pigmented except for interocular surface. Tergites with two well-developed spots laterally and a small spot medially. Metasoma with paired VSM and VL stripes on segments I–IV, and a single VM and paired VL stripes on segment V. Telson glands divided into two separate halves. Hemispermatophore with distal lamina shorter than or equal to basal portion, without internal spines, with the row of spines unbranched, and with a medium-sized basal triangle. *Brachistosternus cekalovici* may be distinguished by the presence of a well-developed VM carina on metasomal segment V (fig. 45), which is absent in *B. negrei*.

The pigmentation pattern of *B. chango* is similar to that of *B. cekalovici*. However, *B. chango* may be distinguished by the presence of two macrosetae associated with the *d* and *e* trichobothria of the pedipalp femur; only a single seta is present in *B. cekalovici*.

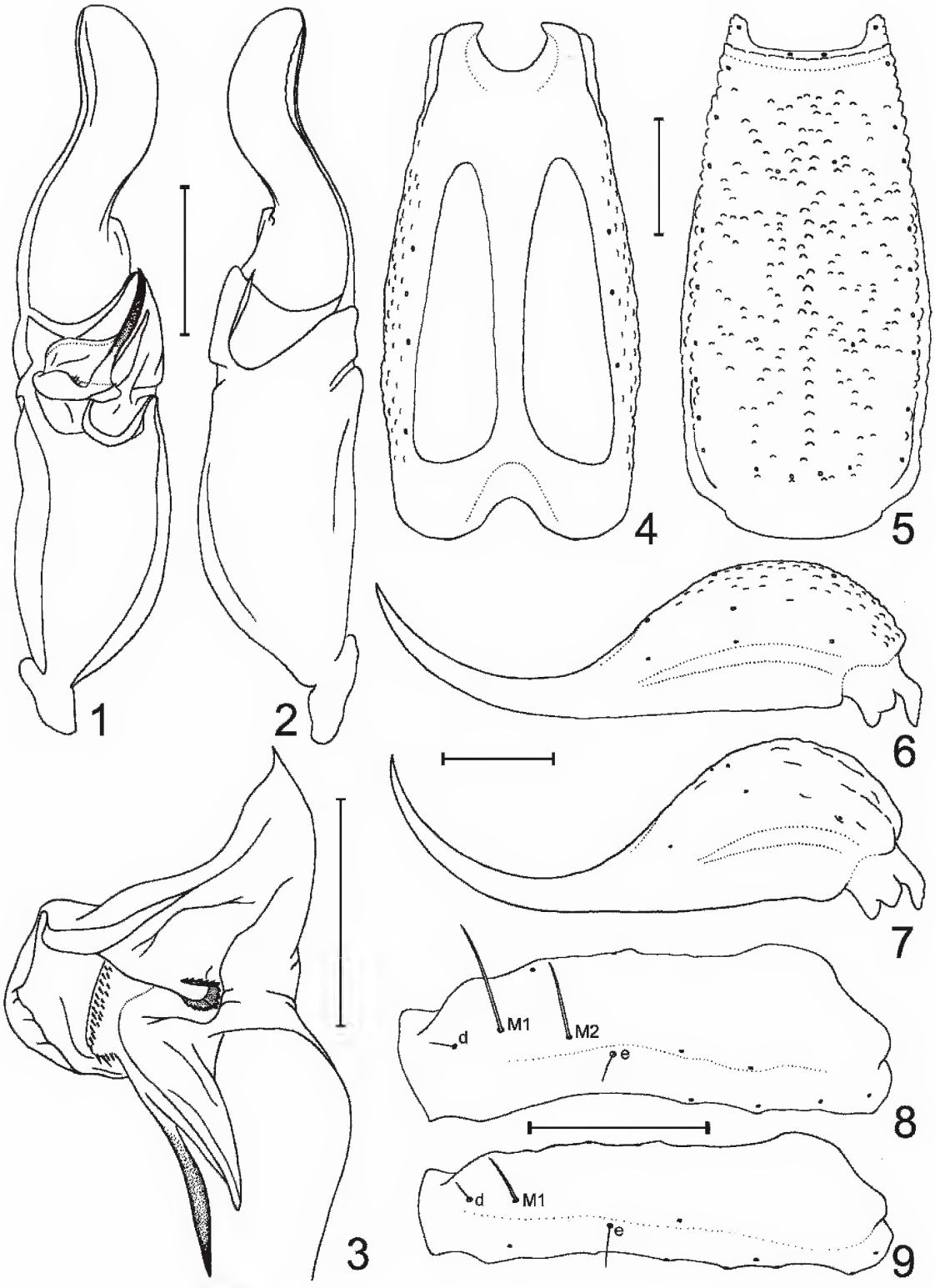
Brachistosternus cekalovici occurs in sympatry with *B. artigasi*. Both species may be separated by the pigmentation pattern of metasomal segments I–IV, which possess paired VSM and VL stripes in *B. cekalovici*, compared to a broad, faint VM and paired VL stripes in *B. artigasi*. The two species may be further distinguished on the basis of setation. *Brachistosternus artigasi* possesses two macrosetae associated with the *d* and *e* trichobothria of the pedipalp femur, whereas *B. cekalovici* possesses only one.

DISTRIBUTION: Previously, this species was known only from the type locality. We provide two new records in the present contribution. This species occurs in the same habitat as *B. artigasi*, near the Pacific coast, in Coquimbo Province, central Chile (fig. 60). All localities where this species has been collected fall within the Matorral Estepario botanical subregion, of the Matorral y Bosque Esclerófilo botanical region (Gajardo, 1993).

NOTES: Specimens from Playa Amarilla and Punta Teatinos differ morphologically from the typical form. In the original description, the male androvestigia were described as very small, occupying less than 25% of the dorsal surface of metasomal segment V (Ojanguren Affilastro, 2005a). However, the specimens from Playa Amarilla exhibit larger androvestigia, in some cases occupying ca. 50% of the dorsal surface. We presently consider this variation to be intraspecific, but specimens from more populations must be collected to assess the range of variation in the species. This is the first bothriurid species in which such variation in the size of the androvestigia has been observed.

Brachistosternus (L.) chango, new species
figures 1–8, 10–13, 18–21, 53, 61, table 1

TYPE MATERIAL: Holotype ♂ (AMNH), **CHILE: Region IV (Coquimbo):** *Choapa Province*: 3.5 km N turnoff to Salamanca, 5 km N Los Vilos, 31°52′13.6″S 71°27′27.1″W, 3.xi.2003, L. Prendini, C.I. Mattoni, and J.A. Ochoa, 30 m, UV light detection on still, cool, cloudy, humid, night, in coastal matorral with cacti on steep, rocky, north-facing slope, clayey-loam soil, syntopic with *Caraboctonus*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2
3
4
5
6
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M1
M2
d
e
8
d
M1
e
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keyserlingi Pocock, 1893. Paratypes: 3♂, 7♀, 7 juv. (MACN-Ar 10930), Los Vilos, 30 km S (near Pichidangui), 32°06′19.8″S 71°30′ 25.1″W, 27.ii.2006, A. Ojanguren, L. Compagnucci, C. Cuezzo, and P. Augusto, 27 m, UV light, 1♂, 1♀ (MZUC), 2 juv. (AMCC 159687), same data.

ETYMOLOGY: The specific epithet is a noun in apposition referring to the Changos Indian tribe that formerly inhabited the coastal region from southern Perú to central Chile, including the area where this new species was collected.

DIAGNOSIS: *Brachistosternus chango* is related to *B. artigasi* and *B. roigalsinai*. It may be distinguished from *B. artigasi* by the size of the androvestigia. The androvestigia are very narrow in *B. artigasi* but very broad, occupying almost the entire dorsal surface of metasomal segment V, in *B. chango*.

Brachistosternus chango may be distinguished from *B. roigalsinai* according to the setation on the dorsal surface of the pedipalp femur. *Brachistosternus chango* possesses two macrosetae associated with the *d* and *e* trichobothria of the pedipalp femur, whereas *B. roigalsinai* possesses only one. The two species may be further separated by the morphology of their hemispermatophores. In *B. roigalsinai*, the distal lamina of the hemispermatophore is almost straight, with a very broad apex, the distal lobe is very well developed, and the cylindrical apophysis is very broad apically (see Ojanguren Affilastro, 2002b). In *B. chango*, the distal lamina is slightly curved, the apex and distal lobe are weakly developed, and the cylindrical apophysis is almost the same width throughout its length.

DESCRIPTION: The following description is based on the holotype male (AMNH) and paratypes (MACN, MZUC). Measurements of the holotype male and a paratype female (MACN-Ar 10930) are recorded in table 2.

Color: Base color: pale yellow, with a dusky pattern (figs. 18–21). Chelicerae: unpigmented. Carapace: median ocular tubercle and area around lateral ocelli infuscated; two narrow, dark stripes extending from median ocular tubercle, along anterior longitudinal sulcus, to anterior carapace margin; two broad, dark stripes extending from posterior longitudinal sulcus to lateral ocelli; posterior carapace margin with dark band on each side posterolaterally; remainder unpigmented. Tergites: I–VI each with dark band on either side, joining medially; VII with pair of dark bands posterolaterally, and some reticulate pigmentation laterally, creating a pale unpigmented stripe medially. Sternites: unpigmented. Metasoma: segments I–III, dorsal surfaces each with narrow median band in anterior half of segment, and pair of dark bands posterolaterally, lateral surfaces unpigmented, ventral surfaces each with paired, faint VSM and VL stripes, which may be absent in some specimens; segment IV similar to segments I–III, except dorsal bands faint and ventral surface with paired, narrow VL stripes and broad, faint VM stripe, in some specimens partially divided into pair of VSM stripes connected by reticulate pigmentation; segment V dorsal and lateral surfaces unpigmented, ventral surface with single narrow VM and paired, broad VL stripes. Telson: vesicle with pale reticulate pigmentation; aculeus dark brown. Pedipalps: femur faintly pigmented near articulation with patella; patella faintly pigmented along anterior and posterior margins; chela unpigmented. Legs: femur pigmented near articulation with patella; patella pigmented near articulation with femur; remaining segments unpigmented.

Chelicerae: Two subdistal teeth.

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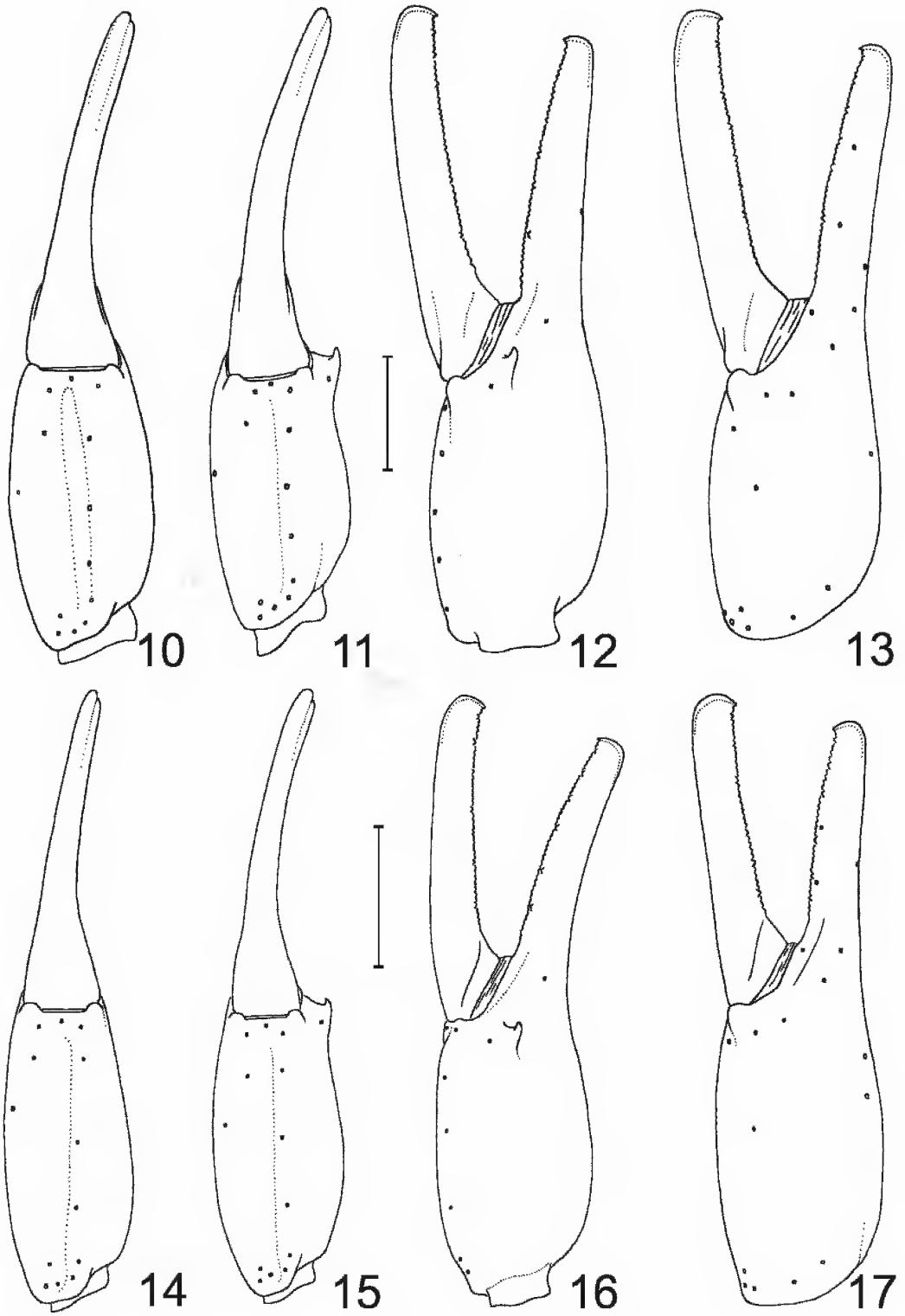
Figs. 1–9. Diagnostic characters of Chilean *Brachistosternus* Pocock, 1893. 1–8. *Brachistosternus* (*L.*) *chango*, n.sp. **1**. Sinistral hemispermatophore, internal aspect. **2**. Sinistral hemispermatophore, external aspect. **3**. Sinistral hemispermatophore, detail of lobe region. **4**. Metasomal segment V, male, dorsal aspect. **5**. Metasomal segment V, male, ventral aspect. **6**. Telson, male, lateral aspect. **7**. Telson, female, lateral aspect. **8**. Dextral pedipalp femur, male, external aspect. **9**. *Brachistosternus* (*L.*) *kamanchaca*, n.sp., dextral pedipalp femur, male, external aspect. Scale bars = 1 mm.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Carapace: Anterior margin with weak median projection. Anterior longitudinal sulcus well developed. Ocular tubercle well developed, situated anteromedially, interocular sulcus weakly developed, ocelli one diameter apart. Lateral, posterior longitudinal and posteromarginal sulci well developed. Carapacial surfaces smooth, except for posterior margin, which is slightly granular.

Tergites: Tergites I–VI, surfaces sparsely granular (male) or smooth (female). Tergite VII, surface slightly granular; two weakly developed PM and PL carinae, evident only in posterior half of segment.

Sternites: Median surfaces and posterior margin, coarsely granular, remainder smooth (male) or entirely smooth (female). Spiracles narrow, medium-sized.

Pectines: Pectinal tooth count, male, 30–32 ($N = 5$; median = 31), female, 28–33 ($N = 8$; median = 29).

Metasoma: Segment I: dorsal, lateral, and ventral surfaces slightly granular (males) or smooth (female); DL and LSM carinae weakly developed, extending entire length of segment; LIM carinae present in posterior half of segment only. Segments II and III similar to segment I except LIM carina restricted to posterior third of segment. Segment IV: dorsal and lateral surfaces slightly granular; ventral surface smooth, covered by scattered macrosetae; DL and LSM carinae weakly developed, extending entire length of segment; LIM carinae absent. Segments I–IV each with pair of dorsolateral macrosetae. Segment V: androvestigia (male) very large, occupying almost 75% of dorsal surface (fig. 4); dorsal and lateral surfaces slightly granular; ventral surface densely granular; ventral macrosetae arranged in three or four rows, the first with four macrosetae, the rest with one or two macrosetae; DL and LSM carinae weakly developed, extending entire length of segment; VM and VL carinae well developed, extending entire length of segment (fig. 5).

Telson: Vesicle with rounded ventral surface. Vesicle surface slightly granular. No telson gland evident. Aculeus slightly (male; fig. 6) to strongly curved (females; fig. 7), same length as vesicle.

Pedipalps: Femur DI, DE, and VI carinae weakly developed; remaining surfaces smooth; two macrosetae (M1 and M2) associated with *d* and *e* trichobothria (fig. 8). Patella DI and VI carinae weakly developed, represented only by scattered granules; remaining surfaces smooth. Chela narrow; surfaces smooth; internal apophysis (male) well developed (figs. 11, 12); VM carina weakly developed (figs. 10, 11); fingers each with median row of denticles and seven or eight pairs of accessory denticles.

Trichobothria: Trichobothrial pattern typical of subgenus *Leptosternus*: Neobothriotaxic Major Type C, with one accessory trichobothrium in *V* series of chela. Femur with 3 trichobothria (1 *d*, 1 *i*, and 1 *e*). Patella with 19 trichobothria (3 *V*, 2 *d*, 1 *i*, *3 et*, 1 *est*, 2 *em*, 2 *esb*, and 5 *eb*). Chela with 27 trichobothria (1 *Est*, 5 *Et*, 5 *V*, 1 *Esb*, 3 *Eb*, 1 *Dt*, 1 *Db*, 1 *et*, 1 *est*, 1 *esb*, 1 *eb*, 1 *dt*, 1 *dst*, 1 *dsb*, 1 *db*, 1 *ib*, 1 *it*) (figs. 10–13).

Legs: Surfaces of all segments smooth. Telotarsi not elongated; I and II each with inner unguis ca. 5% shorter than external (fig. 53).

Hemispermatophore: Distal lamina broad and curved medially, similar in length to basal portion (fig. 2). Cylindrical apophysis well developed, longer than laminar apophysis (fig. 1). Basal triangle well developed, comprising three crests. Internal spines absent. Basal spines and row of spines well developed and aligned along same axis (fig. 3).

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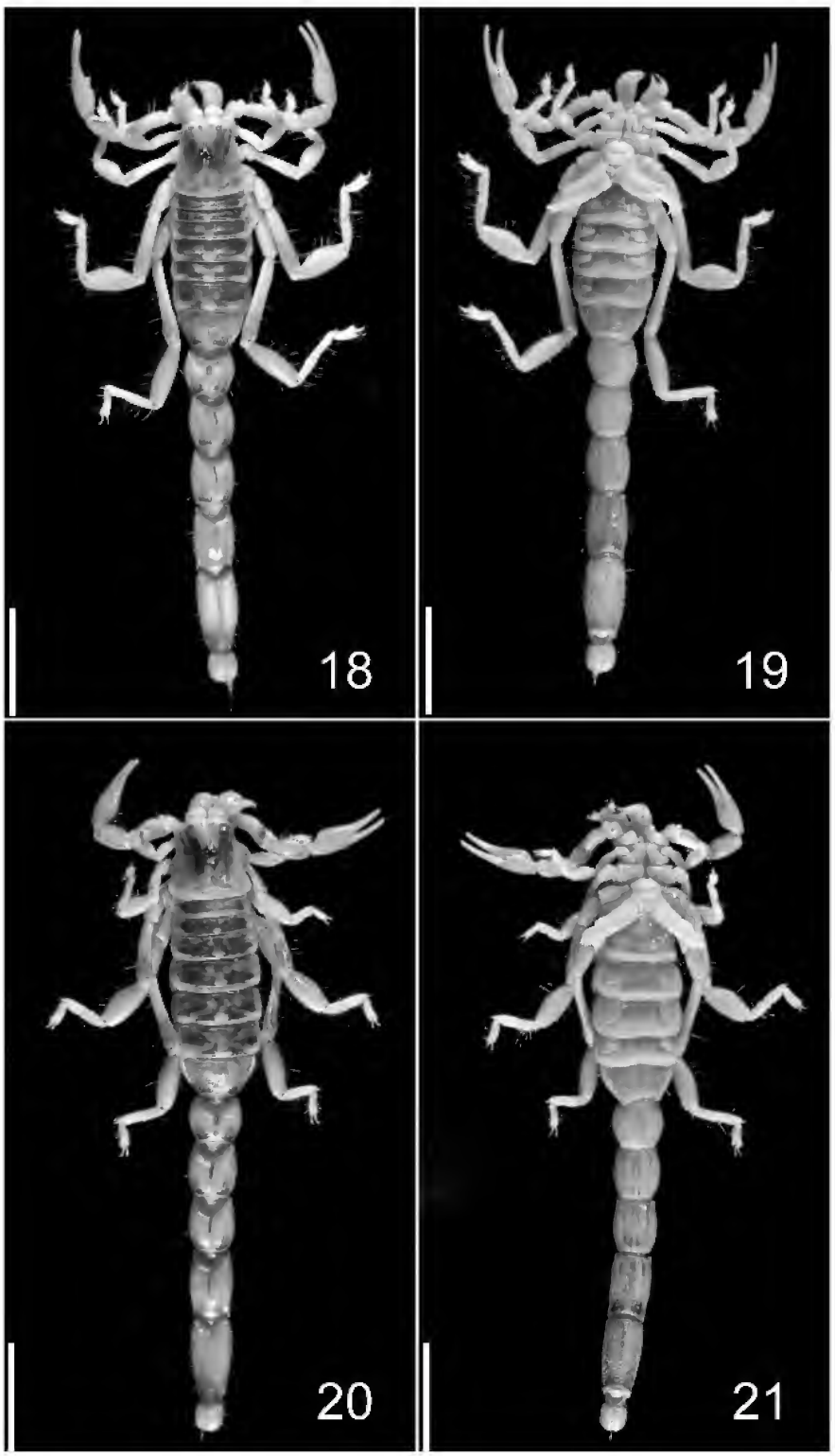
Figs. 10–17. Diagnostic characters of Chilean *Brachistosternus* Pocock, 1893. 10–13. *Brachistosternus* (*L.*) *chango*, n.sp. **10**. Dextral pedipalp chela, female, ventral aspect. **11**. Dextral pedipalp chela, male, ventral aspect. **12**. Dextral pedipalp chela, male, internal aspect. **13**. Sinistral pedipalp chela, female, external aspect. 14–17. *Brachistosternus* (*L.*) *kamanchaca*, n.sp. **14**. Dextral pedipalp chela, female, ventral aspect. **15**. Dextral pedipalp chela, male, ventral aspect. **16**. Dextral pedipalp chela, male, internal aspect. **17**. Sinistral pedipalp chela, female, external aspect. Scale bars = 1 mm.



Figs. 18–21. *Brachistosternus* (*L.*) *chango*, n.sp., habitus of male and female. **18**. Dorsal aspect, male. **19**. Ventral aspect, male. **20**. Dorsal aspect, female. **21**. Ventral aspect, female. Scale bars = 1 cm.

Variation: Pedipalp chela length/height ratio, male, 3.3–3.41 (N = 5; mean = 3.37), female, 3.04–3.26 (N = 8; mean = 3.13); pedipalp chela length/width ratio, male, 4.01–4.47 (N = 5; mean = 4.34), female, 4–4.26 (N = 8; mean = 4.16); metasomal segment V, length/width ratio, male, 1.75–1.83 (N = 5; mean = 1.78), female, 1.71–1.79 (N = 8; mean = 1.75); metasomal segment V, ventral macrosetal count, 8–11 (N = 14; median = 10); metasomal segment V, ventrolateral macrosetal count, 8–10 (N = 14; median = 9); telotarsus III, dorsal macrosetal count, 11–13 (N = 14; median = 12); telotarsus III, ventrointernal macrosetal count, 8–10 (N = 14; median = 9); telotarsus III, ventroexternal macrosetal count, 5–6 (N = 14; median = 5); basitarsus III, dorsal macrosetal count, 6–7 (N =14; median = 7); total length, male, 41.5–50 (N = 5; mean = 46.3), female, 47–58 (N = 8; mean = 51.43).

Distribution: *Brachistosternus chango* is known from only two localities near Los Vilos, close to the coast, in the Choapa Province of the Coquimbo Region of Chile (fig. 61). Both localities occur in the Matorral Estepario botanical subregion, of the Matorral y Bosque Esclerófilo botanical region (Gajardo, 1993).

Ecology: The holotype male was collected at an elevation of 30 m, by UV light detection on a still, cool, cloudy, humid evening (before midnight), in coastal Matorral with cacti on a steep, rocky, north-facing slope. The specimen was sitting still in the open on the surface of clayey-loam soil. Several specimens of an iurid scorpion, *Caraboctonus keyserlingi* Pocock, 1893, were collected at the same locality but appeared to prefer more densely vegetated areas with some leaf litter. The paratypes were collected at a nearby locality with a similar habitat (fig. 22).

Notes: Several characters obscure the phylogenetic relationship of *B. chango* to other species of the genus. This is one of the few species of *Brachistosternus* in which two macrosetae (M1 and M2), associated with the *d* and *e* trichobothria, occur on the pedipalp femur. Only *B. artigasi* shares this character, all other known species of *Brachistosternus* possessing a single macroseta in this position (fig. 9), suggesting that the additional macroseta might be synapomorphic for the two species. The shape of the hemispermatophore of *B. chango* also resembles that of *B. artigasi*, providing a second potential synapomorphy. However, the large size of the androvestigia and shape of the VM carina of metasomal segment V of *B. chango* are similar to those of *B. roigalsinai*, providing potential synapomorphies with this species, which is related to others from the plains of Chile and Perú (Ochoa, 2002; Ojanguren Affilastro, 2005a).

Brachistosternus (*L.*) *chilensis* Kraepelin, 1911
figures 56, 62

Brachistosternus intermedius chilensis: Kraepelin, 1911: 87.

Brachistosternus (*Leptosternus*) *chilensis*: Maury, 1973: 249; Cekalovic, 1983a: 55; Masnú de Moreno, 1991: 185.

Brachistosternus chilensis: Kovařík, 1998: 100; Lowe and Fet, 2000: 49, 50; Ojanguren Affilastro, 2005a: 191.

Type Material: Holotype ♀ (MZIT-Sc 64), **CHILE: Region V (Valparaíso):** *Petorca Province:* La Ligua [32°27′07″S 71°13′41″W].

New Records: **CHILE: Region V (Valparaíso):** *Quillota Province*: Parque Nacional La Campana: Palmas de Ocoa, Sendero Quillay trail from campsite, 32°56′02.53″S 71°04′33.43″W, 12.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 494 m, UV detection, warm, still night, no moon, dry savanna vegetation with palms, dense brush on slopes, large boulders in places, dry leaf litter layer, specimens collected along trail, on roads and roadsides, and in degraded open sandy flats, 8♂, 7♀, 1 juv. (AMNH), 12 juv. (AMCC 159662), 4♂, 1♀, 1 juv. (CDA); same locality, 14.ii.2005, A. Ojanguren and P. Korob, palm forest, 2♂, 3♀, 3 juv. (MACN), 6 juv. (AMCC 159663).

Diagnosis: *Brachistosternus chilensis* is most closely related to an undescribed species (referred to in this paper as *Brachistosternus* sp. 2). The hemispermatophore of these species is similar: The distal lamina is shorter than or equal to the basal portion, the internal spines are absent, the basal spines well developed, the row of spines unbranched, and the basal triangle medium-sized. Both species

Figs. 22–23. Collection localities for *Brachistosternus* Pocock, 1893 in Chile. **22**. Los Vilos, 30 km S (near Pichidangui), habitat of *Brachistosternus* (*L.*) *chango*, n.sp. **23**. Pan de Azúcar National Park, Sector Las Lomitas, habitat of *Brachistosternus* (*L.*) *kamanchaca*, n.sp.

also exhibit a similar pigmentation pattern on the tergites, with two well-developed spots laterally and a small spot medially that is usually absent. Telson glands are absent in both species.

Brachistosternus chilensis may be separated from *Brachistosternus* sp. 2 as follows: the VM stripe of metasomal segments I–IV is narrow and does not join the VL stripes in *B. chilensis* (fig. 56) whereas in *Brachistosternus* sp. 2 it is broad and joins the VL stripes (fig. 55). *Brachistosternus chilensis* may be further distinguished by the presence of a well-developed VM carina on metasomal segment V. The VM carina of metasomal segment V is absent in *Brachistosternus* sp. 2.

Brachistosternus chilensis is also related to *B. negrei*, with which it shares a similar hemispermatophore and pigmentation pattern on the carapace and tergites. Both species may be separated on the basis of the pigmentation pattern of metasomal segments I–IV, which display a single, narrow VM and paired VL stripes in *B. chilensis*, compared with paired VSM and VL stripes in *B. negrei* (fig. 54).

DISTRIBUTION: *Brachistosternus chilensis* occurs in Chile, in Region V "Valparaiso" and in "Region Metropolitana, de Santiago" (fig. 62). All localities where this species has been collected fall into the Bosque Esclerófilo botanical subregion, of the Matorral y Bosque Xerófilo botanical region (Gajardo, 1993).

NOTES: Kraepelin (1911) briefly described this species, in a key, as a variety of *B. intermedius*. No type material was designated, but the description was based on a female specimen from la Ligua, in Valparaiso Region, Chile. Emilio Maury studied the scorpion collection of the Museo ed Istituto di Zoologia di Torino (MIZT) and found a scorpion from the type locality labeled: "*B. intermedius chilensis* n. var. La Ligua; Aconcagua; Chile (Sc. 64)". Maury presumed that this was the specimen described by Kraepelin (E. Maury, unpublished data). Thereafter, Maury implicitly accepted the validity of *B. chilensis*, when mentioning it in a list of the species of subgenus *Leptosternus* (Maury, 1973). We studied this specimen at MIZT, as well as several apparently conspecific specimens from central Chile, and accept the validity of *B. chilensis* based on this examination. A redescription of the species is in preparation by Cristina Scioscia and the first author.

Brachistosternus (*L.*) *donosoi* Cekalovic, 1974
figures 48, 63

Brachistosternus (*Leptosternus*) *donosoi* Cekalovic, 1974: 250–252, 1983a: 55; Ojanguren Affilastro, 2004b: 74, 2005a: 183, 184.

Brachistosternus donosoi: Cekalovic and Artigas, 1981: 81; Cekalovic, 1983b: 188; Kovařík, 1998: 100; Ojanguren Affilastro, 2004b: 69, 2005a: 186, 191.

TYPE MATERIAL: Holotype ♂ (MZUC 530), **CHILE: Region I (Tarapaca):** *Iquique Province*: Pampa del Tamarugal, 10 km E Pica, 20°30′S 69°21′W, ii.1969, R. Donoso.

NEW RECORDS: **CHILE: Region I (Tarapacá):** *Iquique Province*: Pampa del Tamarugal National Park, Salar de Pintados, near ranger's office and camp, 20°26′16.1″S 69°45′55.2″W, 18.i.2005, C. Mattoni, A. Ojanguren, and J. Ochoa, 1014 m, UV sampling in *Prosopis tamarugo* forest and UV under salt plates, 1♂, 1♀, 6 juv. (MACN), 1♂, 1♀ (CDA), 1♂, 1♀, 14 juv. (AMNH), 3 subad. ♀, 7 juv. (AMCC 159688); Oficina Humberstone, near Iquique, 20°12′36.7″S 69°47′29.8″W, 18.i.2005, C. Mattoni, A. Ojanguren, and J. Ochoa, 1048 m, under stones, 1♀, 1 subad. ♂, 1 juv. ♂, 1 juv. ♀ (AMCC 159689); La Tirana, 2 km W, 20°19′59.8″S 69°40′07,6″W, 19.i.2005, 999 m, C. Mattoni, A. Ojanguren, and J. Ochoa, 2♀, 3 juv. (AMNH), 1♂, 1♀, 3 juv. (MACN), 1 juv. (CDA); road to Mamiña, 20°15′18.1″S 69°41′36.7″W, 19.i.2005, C. Mattoni, A. Ojanguren, and J. Ochoa, 1♂, 1♀ (MACN), 1♀ (CDA), 1♀, 4 juv. (AMNH).

DIAGNOSIS: *Brachistosternus donosoi* is most closely related to *B. kamanchaca*. These are the only Chilean species in which the internal spines of the hemispermatophore are reduced to a small group of granules (fig. 30). Both species also exhibit similar, medium-sized androvestigia situated medially on metasomal segment V (fig. 31).

The two species may be distinguished on the basis of their pigmentation pattern. *Brachistosternus donosoi* is usually unpigmented; the most pigmented specimens display a pair of faint spots on the tergites laterally. In

contrast, the carapace and tergites are densely pigmented, and the metasomal segments display dark VL and VM stripes, at least on segments III–V, in *B. kamanchaca*. The two species also differ in the length/width ratio of metasomal segment V. This ratio varies from 1.95 to 2.57 in *B. donosoi* and from 1.63 to 1.9 in *B. kamanchaca*. In addition, *B. kamanchaca*. displays a flatter pedipalp chela. The length/height ratio of the pedipalp chela manus of *B. kamanchaca*. varies from 3.34 to 3.61 in males, and from 3.19 to 3.71 in females whereas, in *B. donosoi*, it varies from 2.87 to 2.97 in males, and from 2.85 to 3.15 in females.

Brachistosternus donosoi is also related to two species from the plains of northern Chile, *B. mattonii* and *B. ochoai*, with which it shares the following characters. The hemispermatophore distal lamina is equal to the basal portion in length, internal spines are present, basal spines well developed, the row of spines well developed and usually branched, and the basal triangle well developed and strongly sclerotized. The inner unguis of telotarsi I and II is 15% longer than the external unguis. The carapace, tergites, and sternites are densely granular in the male.

Brachistosternus donosoi may be distinguished from *B. mattonii* and *B. ochoai* as follows. The androvestigia of *B. donosoi* are medium-sized, compared to the elongated, narrow androvestigia of the other species (fig. 49). The internal spines of the hemispermatophore of *B. donosoi* are reduced to a small group of granules, compared with those of the other species, which are well developed (fig. 40). The ventral surface of metasomal segment IV is smooth in the male of *B. donosoi* (fig. 48), but granular in males of the other species (fig. 47).

DISTRIBUTION: All localities where this species has been collected fall within the Desierto Absoluto botanical subregion (fig. 63), of the Desierto botanical region (Gajardo, 1993).

ECOLOGY: This species inhabits forests of *Prosopis tamarugo*, which is one of the few trees adapted to the extremely xeric conditions in the Atacama desert.

NOTES: See Ojanguren Affilastro (2005a) for a redescription of this species.

Brachistosternus* (*L.*) *kamanchaca, new species
figures 9, 14–17, 24–35, 64, table 2

TYPE MATERIAL: **CHILE: Region III (Atacama):** *Chañaral Province*: Holotype ♂ (MZUC), Pan de Azúcar National Park, Sector Las Lomitas, 26°00′32.6″S 70°36′26.2″W, 24.i.2005, C.I. Mattoni and A.A. Ojanguren Affilastro, 830 m, UV sampling, "lomas" formation, wet with fog, syntopic with *Bothriurus dumayi* Cekalovic, 1974. Paratypes: 1♂, 1♀, 1 juv. (AMNH), 1♂, 1 subad. ♀ (CDA), 2♂, 1♀ (MACN-Ar 10931), 1♀, 3 juv. (MZUC), 1 subad. ♀, 5 juv. (AMCC 159664), same data as holotype.

MATERIAL EXAMINED: **CHILE: Region III (Atacama):** *Copiapó Province*: Copiapó, 10 km S [27°27′30″S 70°22′30″W], xii.2001, P. Korob and A.A. Ojanguren Affilastro, 1♀, 9 juv. (MACN); Copiapó, 70 km S [27°57′S 70°33′W], 4.x.1983, A. Roig Alsina, 3 juv. (ARA); same data, except "E.A. Maury", 1 juv. (MACN); Los Sapos, 2 km from turnoff to Cerro Blanco from road (729) Vallenar–Copiapó, 28°01′25.19″S 70°33′00.4″W, L. Prendini, C. Mattoni, and J. Ochoa, 8.ix.2003, 532 m, UV detection, cool, still night, full moon eclipsed, start of Atacama desert, bare sandy ground with occasional shrubs against low, rocky hills, becoming harder upslope, specimens found on harder ground, syntopic with *B. dumayi*, *Brachistosternus sciosciae* collected nearby on sandy ground, 2♂, 6♀, 7 juv. (AMNH), 2♂, 2♀, 4 juv. (CDA), 34 juv. (AMCC 159665), 1 juv. (AMCC 159666). *Huasco Province*: La Herradura, W of Parque Nacional Llanos de Challe, 28°06′02.02″S 71°09′15.29″W, L. Prendini, C. Mattoni, and J. Ochoa, 10.xi.2003, 35 m, UV detection on cool, dark, breezy night, very humid near beach, coastal sand flats, rocky hill and soils of intermediate hardness between, arid chaparral with cacti and other succulents, specimens on rocky ground, syntopic with *Bothriurus dumayi*, *Brachistosternus roigalsinai*, and *Caraboctonus keyserlingi*, *B. sciosciae* collected nearby on sandy ground, 1♀ (AMNH), 3♀, 3 juv. (AMCC 159667); Llanos de Challe National Park, plains on road to Cerro Negro, 28°11′16.4″S 71°06′06.7″W, 303 m, UV, full moon, 25.i.2005, C. Mattoni, A. Ojanguren. 1♀ (CDA), 1♂ (MACN), 1♂, 2 juv.

(AMNH), 2 juv. (MZUC). Domeyko, 18 km S, on road to observatorio La Silla [29°07′30″S 70°56′W], 3.x.1983, E.A. Maury, 1♂, 9 juv. (MACN).

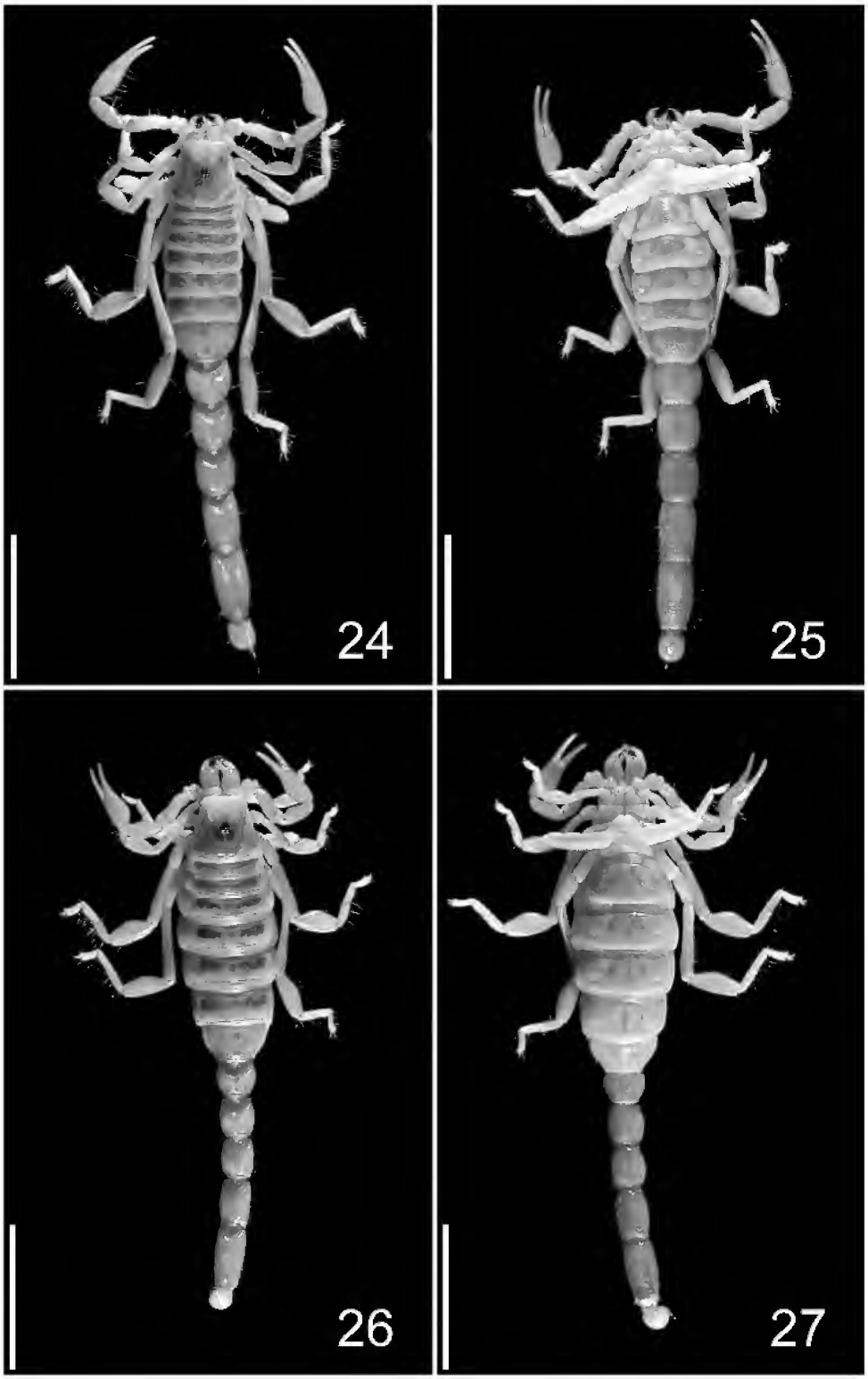
ETYMOLOGY: The specific epithet is a noun in apposition referring to the sea fog occurring along the arid Pacific coastline of central and northern South America, known locally as the "Kamanchaca" or "Camanchaca". The fog exerts a strong influence on the environment and biota of the coastal slopes by increasing their humidity (Rundel et al., 1990).

DIAGNOSIS: *Brachistosternus kamanchaca* is closely related to *B. donosoi*. The two species are readily distinguished by means of pigmentation. *Brachistosternus donosoi* is usually unpigmented or lightly pigmented, whereas *B. kamanchaca* is darkly pigmented. There are also differences in the length/width ratio of metasomal segment V. In *B. donosoi*, this ratio varies from 1.95 to 2.57 whereas in *B. kamanchaca*, it varies from 1.63 to 1.9. In addition, *B. kamanchaca* displays a flatter pedipalp chela. The length/height ratio of the pedipalp chela manus of *B. kamanchaca* varies from 3.34 to 3.61 in males and from 3.19 to 3.71 in females, whereas in *B. donosoi*, it varies from 2.87 to 2.97 in males and from 2.85 to 3.15 in females.

Brachistosternus kamanchaca is also closely related to *B. artigasi* and *B. cekalovici*. It may be distinguished from both species on the basis of the VM carinae of metasomal segment V. Compared to *B. artigasi* and *B. cekalovici*, in which the VM carinae are well developed and extend the entire length of the segment, the VM carinae of *B. kamanchaca* are weakly developed, and usually restricted to the posterior half of the segment. *Brachistosternus kamanchaca* may also be distinguished from these species by the presence of internal spines, represented by a small group of granules, on the hemispermatophore, which are absent in *B. artigasi* and *B. cekalovici*. *Brachistosternus kamanchaca* may be further distinguished from *B. artigasi* according to the setation on the dorsal surface of the pedipalp femur. *Brachistosternus kamanchaca* possesses only one macroseta associated with the *i* and *e* trichobothria of the pedipalp femur, whereas *B. artigasi* possesses two. *Brachistosternus kamanchaca* may be further distinguished from *B. cekalovici* according to the setation on the ventral surface of metasomal segment V. *Brachistosternus kamanchaca* possesses 5–7 rows of macrosetae on the ventral surface of segment V, whereas *B. cekalovici* possesses only 3–4 rows of macrosetae.

DESCRIPTION: The following description is based on the holotype (MZUC) and paratypes (AMNH, CDA, and MACN) from Pan de Azúcar National Park. Measurements of the holotype male (MZUC) and a paratype female (MACN-Ar 10931) are recorded in table 2.

Color: Base color: pale yellow, with a dusky pattern (figs. 24–27). Chelicerae: anterior margin and movable finger with reticulate pigmentation. Carapace: median ocular tubercle and area around lateral ocelli infuscated; interocular surface unpigmented; remainder densely pigmented. Tergites: I–VI each with dark stripe in anterior two-thirds (in some specimens, stripe divided into three dark spots, usually connected by reticulate pigmentation); VII with dark triangle anteromedially, and two dark bands posterolaterally. Sternites: unpigmented. Metasoma: segments I and II, dorsal surfaces each with narrow band medially and pair of dark bands posterolaterally, lateral surfaces unpigmented, ventral surfaces each with single broad VM and paired narrow VL stripes (absent or faint in most specimens, well developed only in very pigmented specimens) joining at posterior margin of segment; segment III similar to segments I and II, except VM stripe usually present; segment IV similar to segment III, except VM stripe always present and well developed; segment V, dorsal surface with faint reticulate pigmentation near anterior and posterior articulations, remainder unpigmented, lateral surfaces unpigmented, ventral surface with paired broad VL stripes and single well-developed, narrow VM stripe, joining in posterior third of segment. Telson: vesicle ventral surface with pale reticulate pigmentation; aculeus dark brown. Pedipalps: femur and patella pigmented on anterior and posterior margins, and near articulations; chela with pale reticulate pigmentation on external surface of manus and near articulation of movable finger, fingers unpigmented. Legs: femur pigmented near articulation with patella; patella pigmented



Figs. 24–27. *Brachistosternus* (*L.*) *kamanchaca*, n.sp., habitus of male and female. **24**. Dorsal aspect, male. **25**. Ventral aspect, male. **26**. Dorsal aspect, female. **27**. Ventral aspect, female. Scale bars = 1 cm.

on anterior margin and near articulations; remaining segments unpigmented.

Chelicerae: Two subdistal teeth.

Carapace: Anterior margin with weak median projection. Anterior longitudinal sulcus well developed. Ocular tubercle well developed, situated anteromedially, interocular sulcus weakly developed, ocelli almost three diameters apart. Lateral, posterior longitudinal and posteromarginal sulci well developed. Carapacial surfaces slightly granular.

Tergites: Tergites I–VI, surfaces entirely smooth, or smooth in anterior two-thirds, and slightly granular in posterior third. Tergite VII, surface slightly granular in posterior half; two PL carinae evident.

Sternites: Surfaces granular (male) or smooth (female). Spiracles narrow, medium-sized.

Pectines: Pectinal tooth count, male, 28–35 (N = 10; median = 30), female, 24–31 (N = 10; median = 28).

Metasoma: Segments I–III: dorsal and lateral surfaces slightly granular; ventral surfaces granular (male) or smooth (female); DL and LSM carinae weakly developed, extending entire length of segment; LIM carinae weakly developed, present in posterior third of segment only. Segment IV: ventral surface smooth, covered by scattered macrosetae; DL carinae weakly developed, extending entire length of segment; LIM carinae absent; LSM carinae evident at anterior and posterior margins of segment only. Segments I–IV each with pair of dorsolateral macrosetae. Segment V: androvestigia medium-sized, situated submedially (fig. 31); dorsal and lateral surfaces slightly granular (male) or smooth (female); ventral surface sparsely granular in posterior two-thirds of segment (fig. 32); ventral macrosetae usually comprising five to seven rows, the first two or three rows with four to six macrosetae, the rest with one to three macrosetae; DL carinae weakly developed (male) or absent (female); VL carinae well developed, extending entire length of segment; VM carina weakly developed, present in posterior two-thirds of segment only.

Telson: Vesicle with rounded ventral surface. Vesicle surface sparsely granular. Telson gland well developed, triangular, partially divided at posterior apex (fig. 35) or, rarely, completely divided. Aculeus slightly curved, same length as vesicle (figs. 33, 34).

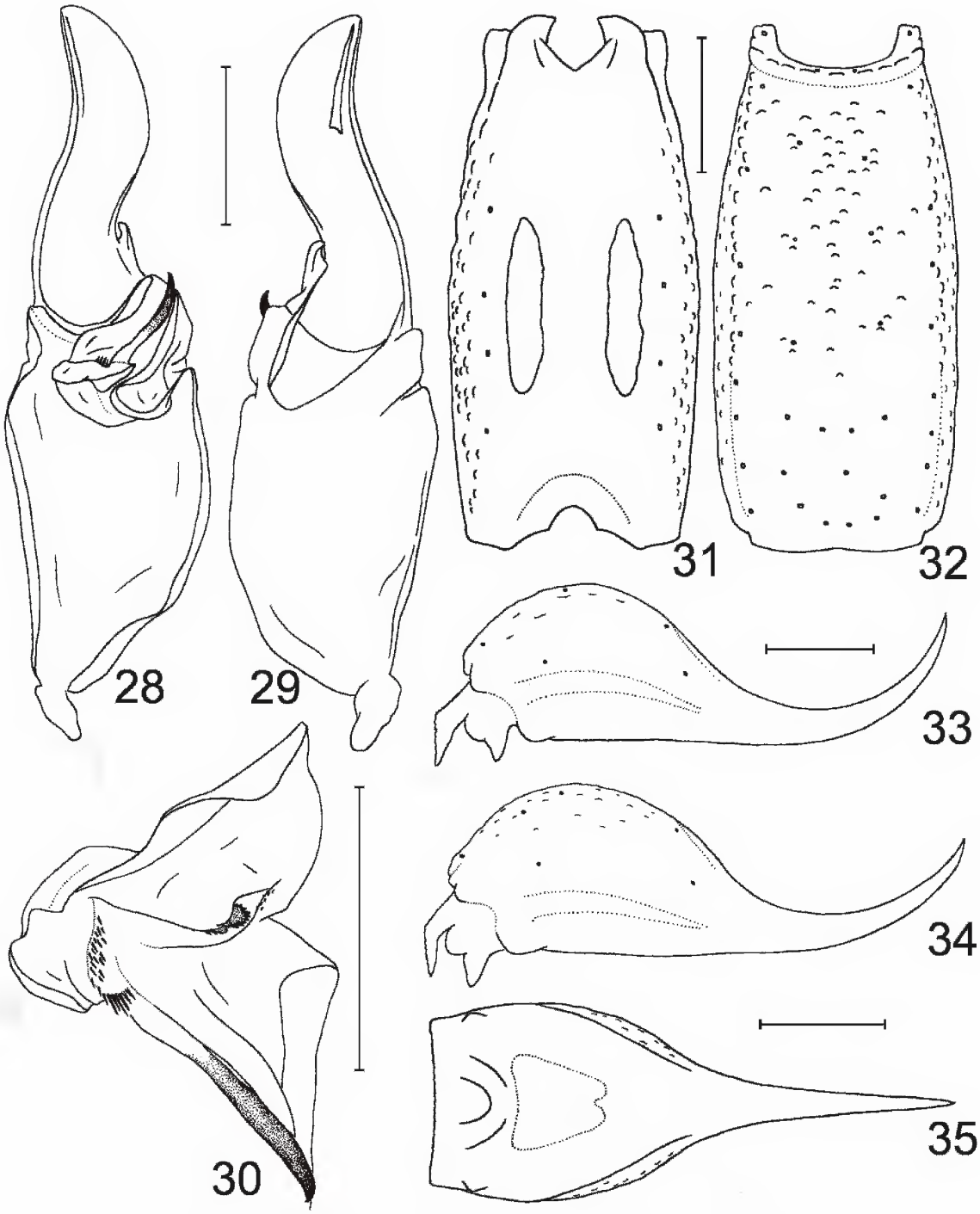
Pedipalps: Femur DI, DE, and VI carinae absent or weakly developed; remaining surfaces smooth; one macroseta (M1) associated with *d* and *e* trichobothria (fig. 9). Patella DI and VI carinae absent or weakly developed; remaining surfaces smooth. Chela: narrow; surfaces smooth; internal apophysis (male) well developed (figs. 15, 16); VM carina weakly developed; fingers each with median row of denticles and four to six pairs of accessory denticles.

Trichobothria: Trichobothrial pattern typical of subgenus *Leptosternus*: Neobothriotaxic Major Type C, with one accessory trichobothrium in *V* series of chela. Femur with 3 trichobothria (1 *d*, 1 *i*, and 1 *e*). Patella with 19 trichobothria (3 *V*, 2 *d*, 1 *i*, 3 *et*, 1 *est*, 2 *em*, 2 *esb*, and 5 *eb*). Chela with 27 trichobothria (1 *Est*, 5 *Et*, 5 *V*, 1 *Esb*, 3 *Eb*, 1 *Dt*, 1 *Db*, 1 *et*, 1 *est*, 1 *esb*, 1 *eb*, 1 *dt*, 1 *dst*, 1 *dsb*, 1 *db*, 1 *ib*, 1 *it*; figs. 14–17).

Legs: Surfaces of femur and patella smooth. Telotarsi very elongated; I and II each with inner unguis ca. 10% shorter than external.

Hemispermatophore: Distal lamina broad, slightly curved, equal to or slightly shorter than basal portion (figs. 28, 29). Cylindrical apophysis well developed, longer than laminar apophysis. Basal triangle well developed, comprising two or three crests. Internal spines reduced to small group of tiny granules. Basal spines and row of spines well developed and aligned along same axis (fig. 30).

Geographic variation: Different populations of *B. kamanchaca* display some variation in pigmentation and granulation. This is common among *Brachistosternus* species with broad distributional ranges, and we do not consider this variation diagnostic at the species level. Additionally, the following meristic variation is recorded in *B. kamanchaca*: pedipalp chela length/height ratio, male, 3.34–3.61 (N = 10; mean = 3.49), female, 3.19–3.71 (N = 8; mean = 3.38); pedipalp chela length/width ratio, male, 4.12–5.03 (N = 10; mean = 4.59), female, 4.07–5 (N = 8; mean = 4.42); metasomal segment V, length/width ratio, male, 1.7–1.9 (N = 10; mean = 1.79), female, 1.63–1.86 (N = 8; mean = 1.73); metasomal segment V, ventral macrosetal count, 13–23 (N



Figs. 28–35. Diagnostic characters of *Brachistosternus* (*L.*) *kamanchaca*, n.sp. **28**. Sinistral hemispermatophore, internal aspect. **29**. Sinistral hemispermatophore, external aspect. **30**. Sinistral hemispermatophore, detail of lobe region. **31**. Metasomal segment V, male, dorsal aspect. **32**. Metasomal segment V, male, ventral aspect. **33**. Telson, female, lateral aspect. **34**. Telson, male, lateral aspect. **35**. Telson, male, dorsal aspect. Scale bars = 1 mm.

= 14; median = 15); metasomal segment V, ventrolateral macrosetal count, 8–11 (N = 12; median = 10); telotarsus III, dorsal macrosetal count, 9–12 (N = 15; median = 10); telotarsus III, ventrointernal macrosetal count, 6–8 (N = 15; median = 6); telotarsus III, ventroexternal macrosetal count, 4–5 (N = 15; median = 5); basitarsus III, dorsal macrosetal count, 6–7 (N = 15; median = 6); total length, male, 34–49 (N = 9; mean = 41.5), female, 39–45 (N = 7; mean = 41.35).

DISTRIBUTION: *Brachistosternus kamanchaca* inhabits the Atacama Region of northern Chile, from 0 to 700 m. Some specimens have been collected in coastal localities, but others have been collected as far as 100 km inland (fig. 64). All localities where this species has been collected fall within the Desierto Costero and Desierto Florido botanical subregions of the Desierto botanical region (Gajardo, 1993).

ECOLOGY: At the type locality in Pan de Azúcar National Park and another locality, La Herradura, *B. kamanchaca* was only collected on high, seaward-facing slopes (fig. 23). These slopes have a Lomas (Spanish for small hills) environment (Rundel et al., 1990), with a microclimate that is markedly more humid than the surrounding desert, because it is under the influence of the sea fog (Kamanchaca). This species was not found in other habitats in Pan de Azúcar National Park. Outside the park, where the species was collected in habitats not associated with Lomas, it always occupied areas with some (sparse) vegetation, mostly small shrubs, loose soil, and only a few rocks.

Brachistosternus kamanchaca was syntopic with the bothriurid *Bothriurus dumayi* at Pan de Azucar, La Herradura, and Los Sapos. At La Herradura, it was also syntopic with *B. roigalsinai* and the iurid *Caraboctonus keyserlingi*. *Brachistosternus sciosciae* was also collected at La Herradura and Los Sapos, but this species was restricted to sandier substrata than *B. kamanchaca*, and the two species appear to be allotopic.

NOTES: Some specimens of *B. kamanchaca* have been collected near Copiapó, the type locality of *B. castroi* (fig. 59), raising the possibility that the new species described here might be a junior synonym of the latter. We examined the holotype of *B. castroi*, a poorly preserved juvenile female with few diagnostic characters, and observed differences in the granulation and carination of metasomal segment V, in the number of macrosetae on metasomal segment V and telotarsus III, and in the pigmentation pattern, prompting our decision to regard both as distinct species. The type material of *B. castroi* closely resembles *B. intermedius*, which has in the past created confusion regarding its identity (Ringuelet, 1953; Ábalos, 1963; Lowe and Fet, 2000). More material must be collected in the vicinity of Copiapó to clearly establish the identity of *B. castroi*.

Brachistosternus (*L.*) *kovariki* Ojanguren Affilastro, 2003
figure 65

Brachistosternus (*L.*) *kovariki* Ojanguren Affilastro, 2003b: 23–36; Ochoa, 2004: 139.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10347), **CHILE: Region II (Antofagasta):** *El Loa Province*: San Pedro de Atacama, 30 km E, 22°56′09″S 67°56′02″W, 3600 m, 30.i.2003, A. Ojanguren Affilastro and P. Korob.

NEW RECORDS: **CHILE, Region III (Atacama):** *El Loa Province*: San Pedro de Atacama, 27 km E, 22°54′49.2″S 67°55′35.5″W, 25.i.2005, C. Mattoni and A. Ojanguren, 3650 m, UV on rocky plains, 3 juv. (MACN), 1♂, 1♀ (CDA), 1♂, 1♀, 1 juv. (AMNH), 2 juv. ♂, 3 juv. ♀, 5 juv. (AMCC 159668).

DIAGNOSIS: *Brachistosternus kovariki* is parapatric with *B. prendinii*, both species inhabiting the same region at different altitudes. *Brachistosternus prendinii* occurs from 2800 to 3200 m, and *B. kovariki* from 3200 to 3600 m. The two species may be distinguished by the setation of metasomal segment V. *Brachistosternus prendinii* possesses 19–26 ventral setae, whereas *B. kovariki* possesses 8–13 macrosetae. The two species may be further distinguished on the basis of the VM carina of metasomal segment V, which extends the entire length of the segment in *B. kovariki*, but is restricted to the second half of the segment in *B. prendinii*.

Brachistosternus kovariki is closely related to *B. piacentinii*. Both species exhibit a similar pigmentation pattern: tergites with paired spots

TABLE 2
Measurements (mm) of *Brachistosternus* (*Leptosternus*) *kamanchaca*, n.sp. (Holotype and Paratype) and *Brachistosternus* (*Leptosternus*) *chango*, n.sp. (Holotype and Paratype)

	B. (L.) kamanchaca		*B. (L.) chango*	
	Holotype ♂ MZUC	Paratype ♀ MACN	Holotype ♂ AMNH	Paratype ♀ MACN
Total length	43.00	37.28	44.92	54.59
Carapace, length	5.17	4.44	5.25	6.46
Carapace, anterior width	3.64	3.15	3.88	4.60
Carapace, posterior width	5.58	4.53	5.82	6.87
Mesosoma, total length	12.71	13.86	10.59	15.80
Metasoma, total length	19.79	14.78	22.86	25.30
Metasomal segment I, length	3.23	2.42	4.00	3.80
Metasomal segment I, width	3.31	2.51	3.40	4.44
Metasomal segment I, height	2.75	2.02	2.80	3.55
Metasomal segment II, length	3.64	2.66	4.16	4.44
Metasomal segment II, width	3.07	2.18	3.24	4.04
Metasomal segment II, height	2.75	2.02	2.80	3.55
Metasomal segment III, length	3.79	2.83	4.24	4.69
Metasomal segment III, width	2.91	2.10	3.08	3.88
Metasomal segment III, height	2.59	1.94	2.80	3.39
Metasomal segment IV, length	4.28	3.15	4.80	5.66
Metasomal segment IV, width	2.75	2.00	2.93	3.64
Metasomal segment IV, height	2.51	1.78	2.68	3.07
Metasomal segment V, length	4.85	3.72	5.66	6.71
Metasomal segment V, width	2.83	2.02	3.08	3.39
Metasomal segment V, height	2.26	1.54	2.58	2.83
Telson, length	5.33	4.20	6.22	7.03
Vesicle, length	3.07	2.26	3.72	3.64
Vesicle, width	2.10	1.59	2.08	2.34
Vesicle, height	1.86	1.37	1.84	2.26
Aculeus, length	2.26	1.94	2.50	3.39
Femur, length	4.20	3.07	3.60	3.72
Femur, width	1.13	0.93	1.04	1.29
Patella, length	3.79	3.07	3.60	3.80
Patella, width	1.45	1.21	1.48	1.65
Chela, length	7.19	5.17	6.14	6.78
Chela, width	1.78	1.13	1.53	1.70
Chela, height	2.18	1.45	1.86	2.18
Movable finger, length	4.12	2.83	3.72	4.04

laterally and a single spot medially, usually connected by reticulate pigmentation; metasomal segments I–III with a single VM and paired VL stripes, densely pigmented but not joining at the posterior margin of the segments; metasomal segment IV with a single, broad VM and paired, narrow VL stripes, joining in the posterior third of the segment; metasomal segment V with a narrow VM and paired, broad VL stripes, joining in the posterior third of the segment. The hemispermatophore of both species is also similar: Internal spines are absent; basal spines are well developed; the row of spines is well developed but unbranched; the basal triangle is medium-sized. However, they differ in the shape of the distal lamina, which is narrow and equal to the basal portion in length in *B. kovariki*, but broad and shorter than the basal portion in *B. piacentinii*. Both species may be further separated by means of the dimensions of metasomal segment V. In *B. kovariki*, the length/width ratio of metasomal segment V

varies from 1.8 to 1.95 whereas, in *B. piacentinii*, it varies from 1.7 to 1.8. Finally, the VM carina of metasomal segment V extends the length of the segment in *B. kovariki* but is restricted to the posterior half in *B. piacentinii*.

DISTRIBUTION: *Brachistosternus kovariki* has only been collected in a small area of western Antofagasta (fig. 65), between 3200 and 3600 m (Ojanguren Affilastro, 2003b). All localities where this species has been collected fall within the Altiplano y Puna botanical subregion of the Estepa Alto-Andina botanical region (Gajardo, 1993). At the same latitude in neighboring Argentina, this species is replaced by *B. intermedius* in similar habitats and altitudes (Ojanguren Affilastro, 2004a).

Brachistosternus (*L.*) *mattonii* Ojanguren Affilastro, 2005
figures 49, 66

Brachistosternus (*L.*) *mattonii* Ojanguren Affilastro, 2005a: 175–192.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10235), **CHILE: Region II (Antofagasta):** *Antofagasta Province*: Hornitos [22°75′S 70°18′W], 2.x.1983, E. Maury (MACN-Ar 10235).

DIAGNOSIS: *Brachistosternus mattonii* is closely related to *B. ochoai*. Both species are characterized by hemispermatophores with well-developed internal and basal spines, a well-developed, usually branched row of spines, and a strongly sclerotized basal triangle (fig. 40); elongated, narrow androvestigia (fig. 49); absence of the telson gland; inner unguis of telotarsi I and II 15% longer than external unguis; carapace, tergites, sternites, and metasomal segment IV densely granular in males (fig. 47); DI, VI, and DE carinae of pedipalp femur, and DI and VI carinae of pedipalp patella very well developed and extending the entire length of the segment.

The two species may be distinguished as follows. *Brachistosternus mattonii* is almost completely unpigmented, the most pigmented specimens displaying only very faint reticulate pigmentation around the ocular tubercle and along the lateral margins of the tergites. In constrast, *B. ochoai* is densely pigmented on the carapace, tergites, and metasomal segment V, the ventral surface of which displays a single VM and paired VL stripes, whereas the dorsal surface displays an antero-median and two posterolateral spots. Both species may also be distinguished according to the dimensions of the pedipalp chela. The length/height ratio varies from 2.9 to 3.11 in the males of *B. mattonii* and is 3.13 in the female, whereas it varies from 3.25 to 3.6 in the males of *B. ochoai* and from 3.02 to 3.21 in the females.

DISTRIBUTION: This species inhabits coastal areas of northern Chile, in the Iquique and Antofagasta regions (fig. 66). All localities where it has been collected fall within the Desierto Costero de Tocopilla, in the Desierto costero botanical subregion of the Desierto botanical Region (Gajardo, 1993).

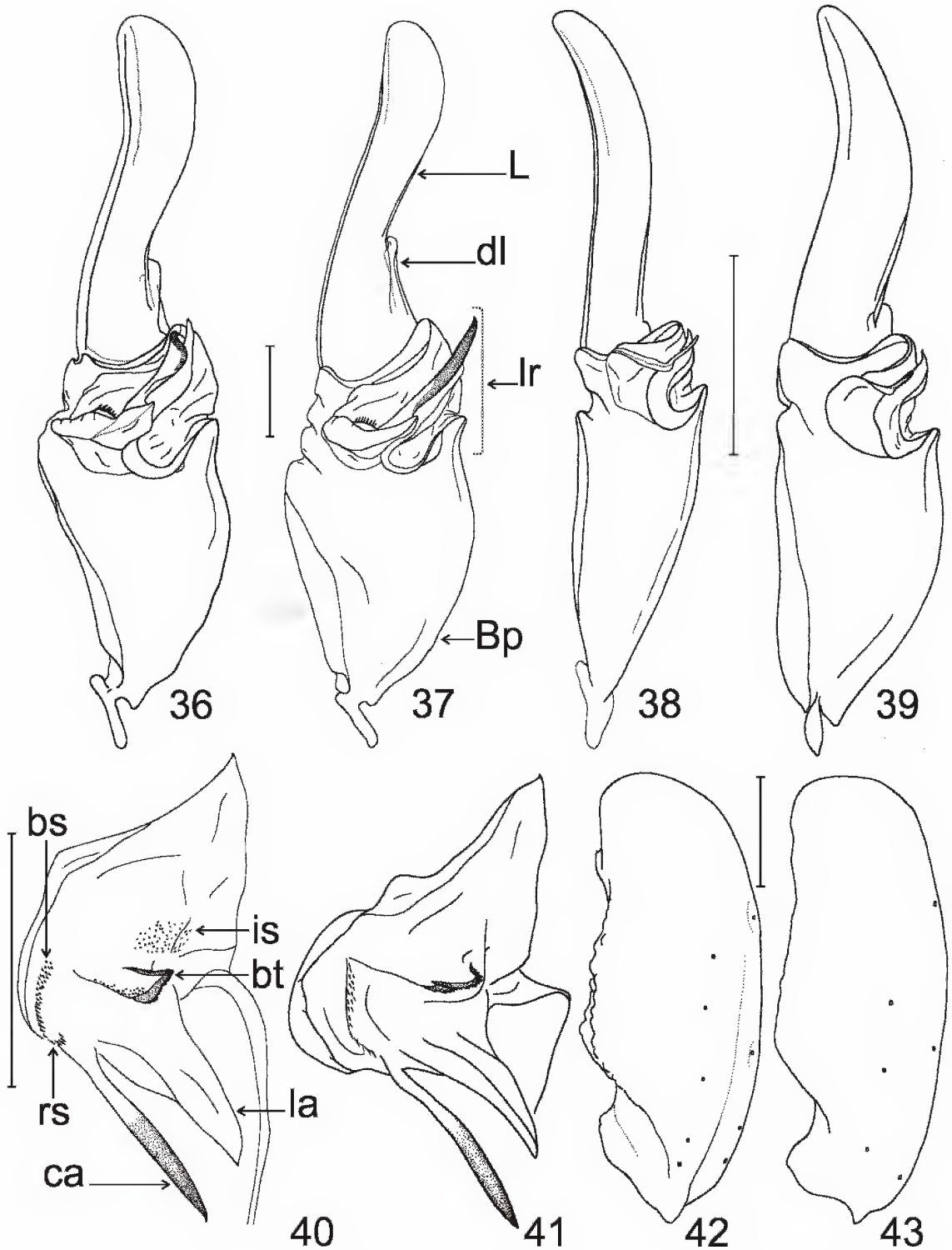
Brachistosternus (*L.*) *negrei* Cekalovic, 1975
figures 54, 67

Brachistosternus (*Leptosternus*) *negrei* Cekalovic, 1975: 69–72. Cekalovic and Artigas, 1981: 81; Cekalovic, 1983a: 56, 1983b: 188. Ojanguren Affilastro, 2005a: 188.

Brachistosternus negrei: Kovařík, 1998: 101; Lowe and Fet, 2000: 51. Ojanguren Affilastro, 2005a: 189–191.

TYPE MATERIAL: Holotype ♂ (MZUC 546, lost), **CHILE**: **Region VII (Maule):** *Talca Province*: Talca, 22 miles N [35°17′S 71°38′W], 22.xii.1950, Ross and Michelbacher.

NEW RECORDS: **CHILE: Region VII (Maule):** *Cauquenes Province*: Reserva Nacional Los Ruiles, NW Cauquenes, 35°49′30″S 72°30′30″W, 13.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 146 m, UV detection on cool, still, dark, humid night in *Nothofagus* forest on steep west-facing slope, small river at base of slope, specimens taken on open sandy ground near river and around campsite, 5 juv. (CDA), 10 juv. (AMCC 159669). *Talca Province*: Parque Nacional Altos del Lircay [35°38′S 71°10′W], 16.ii.2005, A. Ojanguren and P. Korob, 1500 m, sub-Andean forest, 3♂, 2♀, 2 juv. (MACN), 2 juv. (AMCC 159671). **Region Metropolitana de Santiago**: *Melipilla Province*: El Membrillo [34°00′S 71°06′W], 15.xii.2004, J.S. Ascher and A. Kawahara, UV light detection at night, 7♂, 3♀, 14 juv. (AMCC 159670).



Figs. 36–43. Diagnostic characters of Chilean *Brachistosternus* Pocock, 1893. 36, 42. *Brachistosternus* (*B.*) *ehrenbergii* (Gervais, 1841). **36**. Sinistral hemispermatophore, internal aspect. **42**. Sinistral pedipalp

DIAGNOSIS: *Brachistosternus negrei* is closely related to *B. cekalovici*, with which it shares the following combination of characters: carapace densely pigmented except for interocular surface, tergites with two well-developed spots laterally and a small spot medially, metasomal segments I–IV with paired VSM and VL stripes, metasomal segment V with a single VM and paired VL stripes (fig. 54); telson glands divided into two separate halves; hemispermatophore with distal lamina shorter than or equal to basal portion, internal spines absent, basal spines well developed, with row of spines unbranched, and basal triangle medium-sized. The two species may be separated by the presence, in *B. cekalovici*, of a well-developed VM carina on metasomal segment V. The VM carina is absent in *B. negrei*.

Brachistosternus negrei is also related to *B. chilensis*. The two species share similar hemispermatophores and pigmentation pattern, except for the ventral surface of the metasoma, which displays paired VSM and VL stripes on segments I–IV in *B. negrei* (fig. 54), compared with a single VM and paired VL stripes in *B. chilensis* (fig. 56). *Brachistosternus chilensis* may be further distinguished by the presence of a well-developed VM carina on metasomal segment V. The VM carina is absent in *B. negrei*.

DISTRIBUTION: *Brachistosternus* (*L.*) *negrei* is the southernmost species of *Brachistosternus* in Chile. Previously, this species was recorded only from the Maule and Bio-Bio Regions. In the present contribution, we provide records from the southern part of Región Metropolitana de Santiago (fig. 67). All localities where this species has been collected fall within the Matorral y Bosque Esclerófilo and Bosque Caducifolio botanical regions (Gajardo, 1993).

Brachistosternus (*L.*) *ochoai* Ojanguren Affilastro, 2004
figures 40, 47, 68

Brachistosternus (*L.*) *ochoai* Ojanguren Affilastro, 2004b: 69–74.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10517), **CHILE: Región III (Atacama):** *Chañaral Province*: Pan de Azúcar National Park [26°09′S 70°39′W], ii.2003, A. Ojanguren Affilastro and P. Korob.

NEW RECORDS: **CHILE: Region III (Atacama):** *Chañaral Province*: Parque Nacional Pan de Azúcar, near Chañaral: Caleta Pan de Azúcar (dunes behind beach camp), 26°09′04.55″S 70°40′00.36″W, 9.xi.2003, C. Mattoni, L. Prendini, and J. Ochoa, 20 m, UV detection, cool, still night, moon completely obscured by clouds, coastal flats and shrub-coppice dunes 300 m from beach, specimens in open ground, 1 juv. (CDA), 3 juv. (AMCC 159672); Quebrada Pan de Azúcar, 8 km from Pan de Azúcar, 26°06′47.49″ S 70°34′08.42″W, 9.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 229 m, UV detection on cool, still night, moon partly obscured by clouds, Atacama desert with steep scree slopes and alluvial flats at the base, specimen on rocks at base of slope, 1♀ (AMCC 159673).

DIAGNOSIS: *Brachistosternus ochoai* is most closely related to *B. turpuq* from southern Peru (Ochoa, 2002, 2005). Both species share the following combination of characters. The hemispermatophores possess well-developed internal and basal spines, a very well-de-

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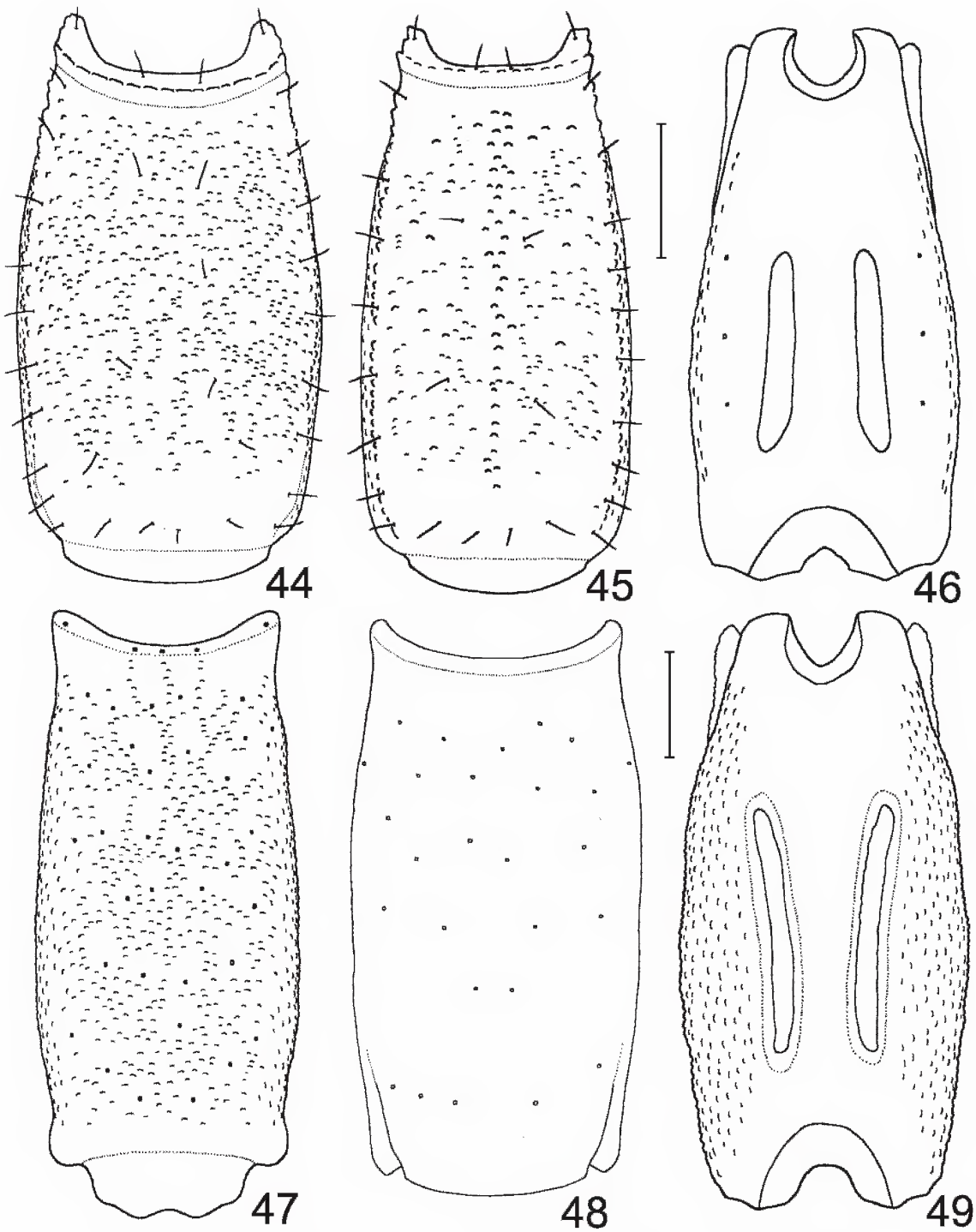
patela, ventral aspect. **37**. *Brachistosternus* (*L.*) *roigalsinai* Ojanguren Affilastro, 2002. Sinistral hemispermatophore, internal aspect. **38**. *Brachistosternus* (*L.*) *sciosciae* Ojanguren Affilastro, 2002. Sinistral hemispermatophore, internal aspect. **39**. *Brachistosternus* (*L.*) sp. 1. Sinistral hemispermatophore, internal aspect. **40**. *Brachistosternus* (*L.*) *ochoai* Ojanguren Affilastro, 2004. Sinistral hemispermatophore, internal aspect, detail of lobe region. **41**. *Brachistosternus* (*L.*) sp. 3. Sinistral hemispermatophore, internal aspect, detail of lobe region. **43**. *Brachistosternus* (*L.*) *perettii* Ojanguren Affilastro and Mattoni, 2006. Sinistral pedipalp patela, ventral aspect. Scale bars = 1 mm. Abbreviations: L = distal lamina; Bp = basal portion; lr = lobe region; dl= distal lobe; ca = cylindrical apophysis; la = laminar apophysis; bt = basal triangle; is = internal spines; rs = row of spines; bs: basal spines.



Figs. 44–49. Diagnostic characters of Chilean *Brachistosternus* Pocock, 1893. **44**. *Brachistosternus* (*L.*) sp. 2. Metasomal segment V, ventral aspect. **45**. *Brachistosternus* (*L.*) *cekalovici* Ojanguren Affilastro, 2005. Metasomal segment V, ventral aspect. **46**. *Brachistosternus* (*L.*) *artigasi* Cekalovic, 1974. Metasomal segment V, male, dorsal aspect. **47**. *Brachistosternus* (*L.*) *ochoai* Ojanguren Affilastro, 2004. Metasomal segment IV, male, ventral aspect. **48**. *Brachistosternus* (*L.*) *donosoi* Cekalovic, 1974. Metasomal segment IV, male, ventral aspect. **49**. *Brachistosternus* (*L.*) *mattonii* Ojanguren Affilastro, 2005. Metasomal segment V, male, dorsal aspect. Scale bars = 1 mm.

veloped, usually branched row of spines, and a strongly sclerotized basal triangle (fig. 40). The androvestigia are narrow and elongated. The carapace, tergites, sternites, and metasoma, including segment V (which are smooth in most species), are densely granular in males (fig. 47). The inner unguis of telotarsi I and II is 15% longer than the external unguis. The telson gland is absent. The DI, VI, and DE carinae of the pedipalp femur and DI and VI carinae of the pedipalp patella are well developed and extend the entire length of the segment.

The two species may be separated as follows. The metasoma of *B. turpuq* is completely unpigmented, compared to that of *B. ochoai*, in which a triangular spot is evident at the anterior margin of the dorsal surface of each segment (restricted to segment V in some specimens), and a single VM and paired VL stripes are evident on metasomal segment V. Both species may also be separated according to the dimensions of metasomal segment V. The length/width ratio varies from 1.8 to 1.9 in *B. turpuq* and from 1.92 to 2.03 in *B. ochoai*.

Brachistosternus ochoai is also related to *B. mattonii*, from which it may be distinguished on the basis of pigmentation. In *B. ochoai*, the carapace and tergites are densely pigmented, and metasomal segment V displays a single VM and paired VL stripes whereas in *B. mattonii*, the metasoma and, in most specimens, also the carapace and tergites are unpigmented, the most strongly pigmented specimens displaying only faint reticulate pigmentation in the central area of the carapace and near the lateral margins of the tergites. Both species may be further distinguished by the dimensions of the pedipalp chela. The length/height ratio of the chela of *B. ochoai* varies from 3.25 to 3.6 in males, and from 3.02 to 3.21 in females whereas in *B. mattonii*, it varies from 2.9 to 3.11 in males and is 3.13 in the female.

DISTRIBUTION: This species inhabits plains along the Pacific coastline, in the Atacama Region of northern Chile (fig. 68). All localities where it has been collected fall within the Desierto Costero botanical subregion, of the Desierto botanical region (Gajardo, 1993).

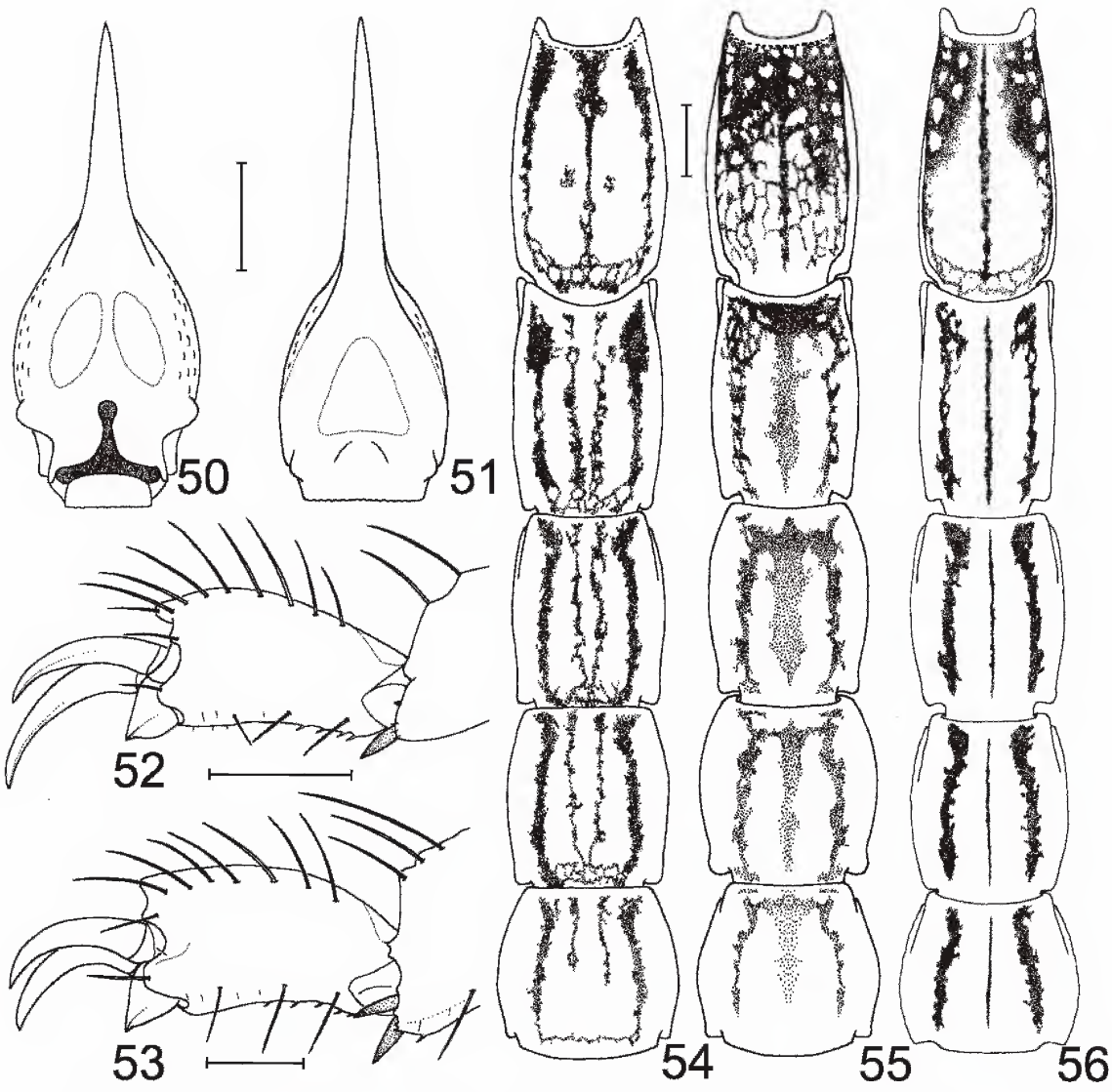
Brachistosternus (*L.*) *perettii* Ojanguren Affilastro and Mattoni, 2006
figures 43, 50, 69

Brachistosternus (*L.*) *perettii* Ojanguren Affilastro and Mattoni, 2006: 79–84.

TYPE MATERIAL: Holotype ♂ (MZUC-UCCC 28634), **CHILE: Region IV (Coquimbo):** *Elqui Province*: Pastos Largos, "El Indio" Gold Mine, 3600 m [29°49′S 70°03′W], pitfall, i.1993, H. Vasquez C.

NEW RECORDS: **CHILE: Region IV (Coquimbo):** *Elqui Province*: Quebrada el Negro, Mina El Indio [29°47′S 70°00′W], 6.xi.2003, C. Mattoni, L. Prendini, J. Pizarro, and J. Ochoa, 3800 m, UV detection at night, alpine vegetation with low bushes and grass tufts on hard, rocky ground with bare patches and stones in places, very cold and windy, full moon, specimens in open areas and under vegetation, 1♀, 1 juv. (AMNH), 1 juv. (CDA), 5 juv. (AMCC 159674); Cancha de Sky (Sky Camp), Mina El Indio, 3300 m [29°51′S 70°03′W], 6.xi.2003, C. Mattoni, L. Prendini, J. Pizarro, and J. Ochoa, UV detection, 1♀ (AMNH), 1 juv. (CDA); Pista de Aterrizaje (Aeropuerto), airport landing strip, Mina El Indio [29°51′S 70°03′W], ca. 4000 m, 6.xi.2003, C. Mattoni, L. Prendini, J. Pizarro, and J. Ochoa, UV detection, 1♀ (AMNH), 1 juv. (CDA); road to Mina el Indio, 3 km from entrance [29°53′30″S 70°03′W], 26.ii.2004, C. Mattoni, J. Ochoa, and J. Pizarro, 2850 m, 3 juv. (AMCC 159675). *Elqui Province*: Paso del Agua Negra, between Juntas and international border, 30°16′14.5″S 69°58′27.9″W, 27.i.2005, C. Mattoni and A. Ojanguren, 3295 m, UV on "vega", extremely wet, 1♂, 1♀ (MACN-Ar), 1♂ (CDA), 1♂ (AMNH), 1♂ (AMCC 159676).

DIAGNOSIS: *Brachistosternus perettii* is a typical Andean species of the genus (Ojanguren Affilastro, 2003b). It is medium-sized and densely pigmented and exhibits the trichobothrial pattern of subgenus *Leptosternus* (fig. 43). The tergites display a broad longitudinal stripe, and metasomal segments I–V display a single VM and paired VL stripes that join in all segments. The distal lamina of the hemispermatophore is similar to the basal portion in length and slightly curved

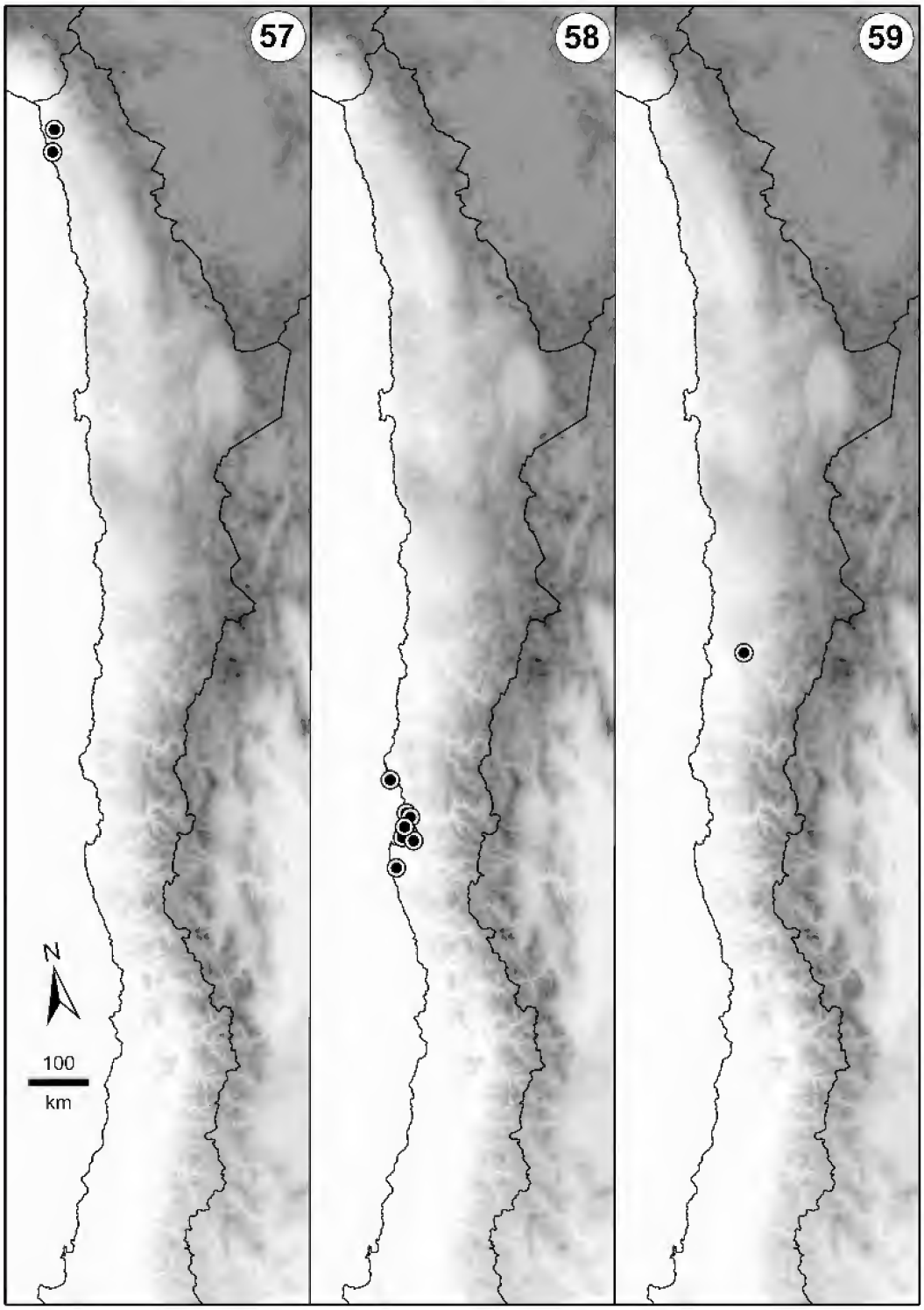


Figs. 50–56. Diagnostic characters of Chilean *Brachistosternus* Pocock, 1893. **50**. *Brachistosternus* (*L.*) *perettii* Ojanguren Affilastro and Mattoni, 2006. Telson, male, dorsal aspect. **51**. *Brachistosternus* (*L.*) sp. 3. Telson, male, dorsal aspect. **52**. *Brachistosternus* (*L.*) sp. 1. Telotarsus I, dextral leg, internal aspect. **53**. *Brachistosternus* (*L.*) *chango*, n.sp. Telotarsus I, dextral leg, internal aspect. **54**. *Brachistosternus* (*L.*) *negrei* Cekalovic, 1975. Metasoma, pigmentation pattern, ventral aspect. **55**. *Brachistosternus* (*L.*) sp. 2. Metasoma, pigmentation pattern, ventral aspect. **56**. *Brachistosternus* (*L.*) *chilensis* Kraepelin, 1911. Metasoma, pigmentation pattern, ventral aspect. Scale bars = 1 mm.

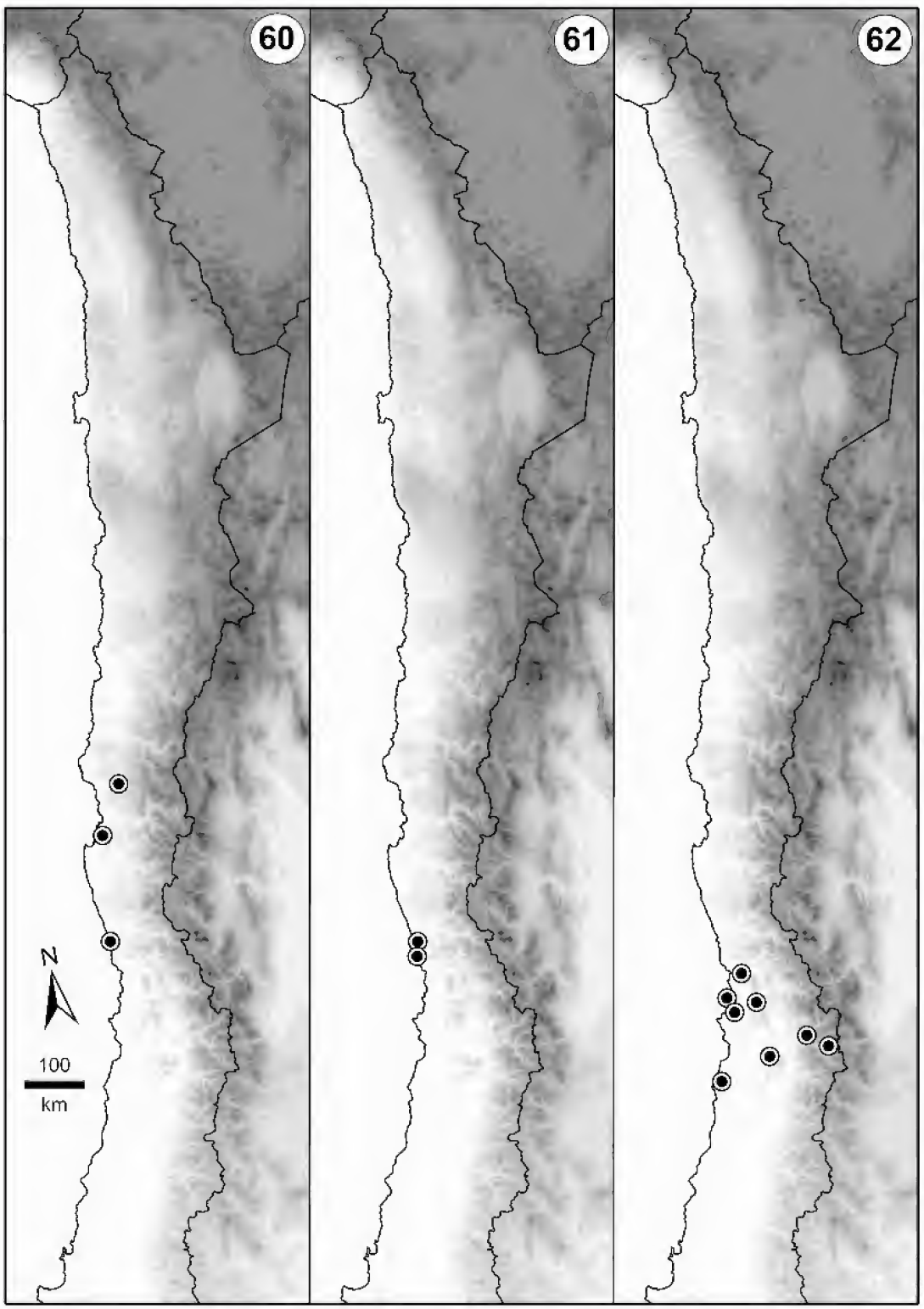
medially, the internal spines are absent, the basal spines, row of spines, and basal triangle are well developed. The male androvestigia are medium-sized.

Brachistosternus perettii may be distinguished from other Andean species of the genus by means of the telson gland, which is completely divided into two separate halves (fig. 50), compared with other Andean species in which it is undivided (fig. 51).

Brachistosternus perettii is sympatric with an undescribed species of *Brachistosternus*,



Figs. 57–59. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **57**. *Brachistosternus ehrenbergii* (Gervais, 1841). **58**. *Brachistosternus artigasi* Cekalovic, 1974. **59**. *Brachistosternus castroi* Mello-Leitão, 1941.



Figs. 60–62. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **60**. *Brachistosternus cekaloviki* Ojanguren Affilastro, 2005. **61**. *Brachistosternus chango*, n.sp. **62**. *Brachistosternus chilensis* Kraepelin, 1911.

referred to here as *Brachistosternus* sp. 3. The two species may be separated by the presence, in *Brachistosternus* sp. 3, of a complete VM carina on metasomal segment V, which is absent in *B. perettii*.

DISTRIBUTION: This species occurs at altitudes between 3200 and 3600 m in the central Andes and the Doña Ana Mountain range in the western part of the Coquimbo Region, Chile (fig. 69). These localities occur within the Andes Mediterráneos botanical subregion of the Desierto Florido botanical region (Gajardo, 1993).

Brachistosternus (*L.*) *piacentinii* Ojanguren Affilastro, 2003
figure 70

Brachistosternus (*L.*) *piacentinii* Ojanguren Affilastro, 2003b: 23–36; Ochoa, 2004: 139.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10349), **BOLIVIA: Oruro Department:** *Sajama Province*: Sajama National Park, near Huañacota lake, 18°02′53″S 68°56′08″W, 4500 m, 23–24.xi.2001, A. Ojanguren Affilastro and P. Korob.

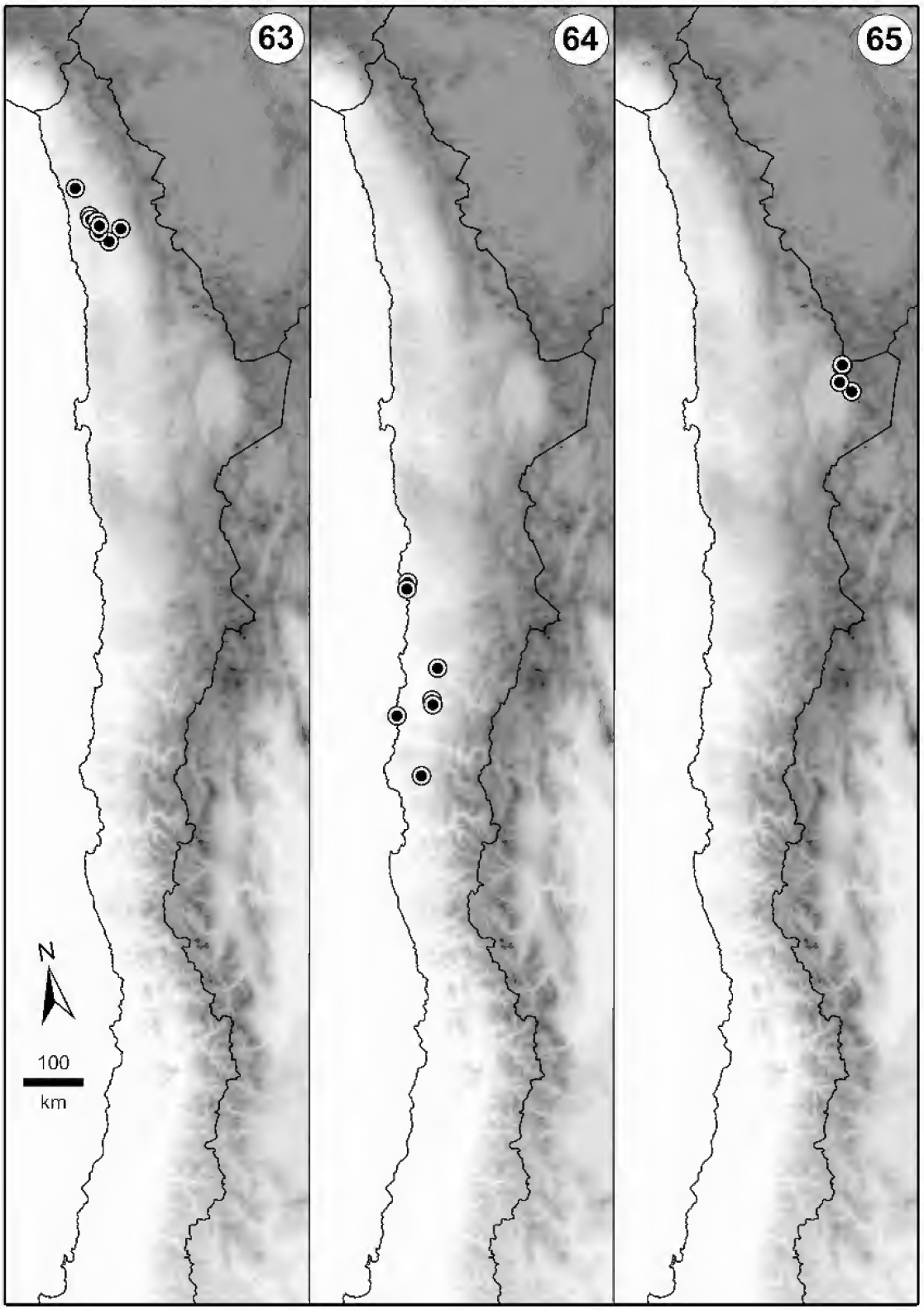
NEW RECORDS: **CHILE: Region I (Tarapacá):** *Parinacota Province*: Parinacota, Lauca National Park, 18°12′01.3″S 69°16′01.4″W, 16.i.2005, C. Mattoni, A. Ojanguren, and J. Ochoa, 4431 m, under stones, 1♂, 1♀, 12 juv. (AMNH), 1♂, 1♀, 3 juv. (CDA), 2 juv. ♂, 1 juv. ♀, 5 juv. (AMCC 159677).

DIAGNOSIS: *Brachistosternus piacentinii* is closely related to *B. kovariki*. The two species display a similar pigmentation pattern, in which the tergites display one spot medially and two spots laterally, usually connected by reticulate pigmentation, metasomal segments I–III display a single VM and paired VL stripes, densely pigmented but not joining at the posterior margin of the segments, metasomal segment IV exhibits a broad VM and paired, narrow VL stripes, joining in the posterior third of the segment, metasomal segment V displays a narrow VM and paired, broad VL stripes, joining in the posterior third of the segment. The hemispermatophore of both species is also similar: The internal spines are absent, the basal spines well developed, the row of spines well developed but unbranched, and the basal triangle medium-sized.

The two species differ in the shape of the distal lamina, which is narrow and equal to the basal portion in length in *B. kovariki*, but broad and shorter than the basal portion in *B. piacentinii*. Both species may be further separated according to the length/width ratio of metasomal segment V, which varies from 1.8 to 1.95 in *B. kovariki* and from 1.7 to 1.8 in *B. piacentinii*. The VM carina of metasomal segment V extends the entire length of the segment in *B. kovariki*, but is restricted to the posterior half in *B. piacentinii*.

Brachistosternus piacentinii is also closely related to *B. titicaca* from central Bolivia and southern Peru (Ochoa, 2002; Ojanguren Affilastro, 2003b). The VM carina of metasomal segment V extends the entire length of the segment in both species. *Brachistosternus piacentinii* and *B. titicaca* also possess similar hemispermatophores. However, in *B. titicaca*, the distal lamina is slightly curved medially and almost equal to the basal portion in length, compared with that of *B. piacentinii*, which is almost straight and shorter than the basal portion. The two species display a similar pigmentation pattern except that, in *B. titicaca*, the VM stripe of the metasoma joins with the VL stripes in metasomal segment V only, whereas in *B. piacentinii*, it joins in metasomal segments IV and V. Both species may be further separated according to the length/width ratio of metasomal segment V, which varies from 1.5 to 1.65 in *B. titicaca* and from 1.7 to 1.8 in *B. piacentinii*.

DISTRIBUTION: *Brachistosternus piacentinii* occurs at altitudes between 4300 and 4500 m, in the Tarapaca Region of northern Chile, and in Sajama Province of eastern Bolivia (fig. 70). This is the only *Brachistosternus* species recorded on both sides of the Andes. At Sajama National Park (Bolivia), *B. piacentinii* is sympatric with *B. galianoae* (Ojanguren Affilastro, 2002c), but the latter is absent in Chile. Both species occur at the maximum altitudes recorded for *Brachistosternus*. All localities where *B. piacentinii* has been collected fall within the Altiplano y Puna botanical subregion of the Estepa Alto-Andina botanical Region (Gajardo, 1993).



Figs. 63–65. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **63**. *Brachistosternus donosoi* Cekalovic, 1974. **64**. *Brachistosternus kamanchaca*, n.sp. **65**. *Brachistosternus kovariki* Ojanguren Affilastro, 2003.

Brachistosternus (*L.*) *prendinii* Ojanguren Affilastro, 2003
figure 71

Brachistosternus (*L.*) *prendinii* Ojanguren Affilastro, 2003b: 24–27; Ochoa, 2004: 139.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10345), **CHILE: Region II (Antofagasta):** *El Loa Province*: San Pedro de Atacama, 20 km E [22°56′S 68°01′W], 2800 m, 31.i.2003, A. Ojanguren Affilastro and P. Korob.

NEW RECORDS: **CHILE: Region III (Atacama):** *El Loa Province*: San Pedro de Atacama, ~20 km E, 22°54′38.8″S 67°59′44.2″W, 25.i.2005, C. Mattoni and A. Ojanguren, 3117 m, UV on rocky plains with some shrubs, 1♀ (AMCC 159678).

DIAGNOSIS: *Brachistosternus prendinii* may be distinguished from most other species of *Brachistosternus* by the large number of macrosetae on the ventral surface of metasomal segment V (19–26). Most other *Brachistosternus* species possess fewer (<17) macrosetae on this surface. Only *B. perettii* possesses a similar number of macrosetae (18–22), but the telson gland of this species is divided into two separate halves (fig. 50), which is not the case in *B. prendinii*. Furthermore, *B. prendinii* possesses a VM carina in the posterior half of metasomal segment V. The VM carina of metasomal segment V is absent in *B. perettii*.

Brachistosternus prendinii is most closely related to *B. quiscapata*. Both species display a similar pigmentation pattern in which the carapace is almost completely pigmented, the tergites display a broad transverse stripe, and the metasomal segments a single VM and paired VL stripes, joining in the posterior margin of all segments. *Brachistosternus prendinii* and *B. quiscapata* possess similar hemispermatophores in which the distal lamina is of moderate length, equal to the basal portion, and slightly curved, internal spines are absent, the row of spines and basal spines well developed, and the basal triangle medium-sized. The two species also exhibit well-developed telson glands, and their androvestigia are medium-sized and similar, albeit slightly more elongated in *B. prendinii* than in *B. quiscapata*. Besides differences in setation on the ventral surface of metasomal segment V, the two species may be separated by means of the VM carina of metasomal segment V, which extends the entire length of the segment in *B. quiscapata*, but is restricted to the posterior half in *B. prendinii*.

DISTRIBUTION: *Brachistosternus prendinii* occurs at altitudes between 2800 and 3200 m, in the western part of the Antofagasta Region (Ojanguren Affilastro, 2003b). At higher altitudes, it is replaced by *B. kovariki*. All localities where this species has been collected (fig. 71) occur in the Altiplano y Puna botanical subregion of the estepa Alto-Andina botanical region (Gajardo, 1993).

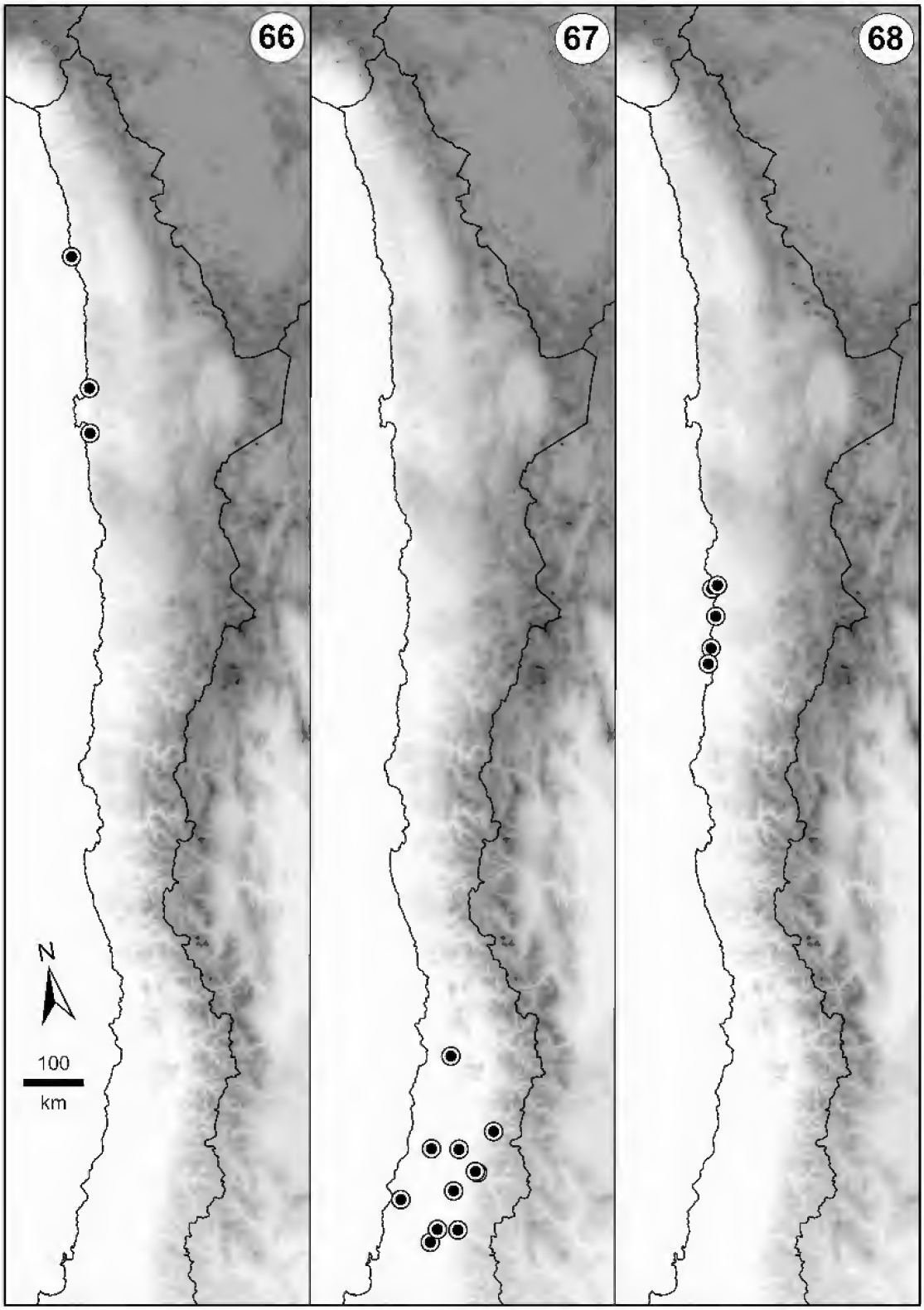
Brachistosternus (*L.*) *quiscapata* Ochoa and Acosta, 2002
figure 72

Brachistosternus (*L.*) *quiscapata* Ochoa and Acosta, 2002: 1–13; Ochoa, 2002: 55, 2004: 139; 2005: 54, 57. Ojanguren Affilastro, 2003b: 25, 34.
Brachistosternus quiscapata: Ojanguren Affilastro, 2003b: 24, 35, 2005a: 191; Ochoa, 2005: 61.

TYPE MATERIAL: Holotype ♂ (MUSM), **PERÚ: Tacna Department:** mountains around Tarata, 3370 m, 17°28′S 70°01′W, 20.i.2000, J. Ochoa.

NEW RECORDS: **CHILE: Region I (Tarapacá):** *Parinacota Province*: Putre, 6 km W, 18°13′26.8″S 69°32′47.1″W, 16.i.2005, C. Mattoni, A. Ojanguren, and J. Ochoa, 3732 m, UV and under stones, 1♂, 1♀, 2 juv. (AMNH), 1 juv. (CDA), 1♀, 1 juv. ♂ (AMCC 159679).

DIAGNOSIS: *Brachistosternus quiscapata* is most closely related to an undescribed species of *Brachistosternus* from the central Andes of Chile, referred to here as *Brachistosternus* sp. 3. Both species display a similar pigmentation pattern, in which the carapace is almost completely pigmented, the tergites display a broad transverse stripe, and the metasomal segments a single VM and paired VL stripes, joining at the posterior margin of all segments. Both species possess similar hemispermatophores, in which the distal lamina is slightly curved, of moderate length, and equal to the basal portion, the internal spines are absent, the basal spines and row of spines well developed, and the basal triangle medium-sized. Both species also exhibit a well-de-



Figs. 66–68. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **66**. *Brachistosternus mattonii* Ojanguren Affilastro, 2005. **67**. *Brachistosternus negrei* Cekalovic, 1975. **68**. *Brachistosternus ochoai* Ojanguren Affilastro, 2004.

veloped telson gland and similar, medium-sized androvestigia. The VM carina of metasomal segment V extends the entire length of the segment in both species. *Brachistosternus* sp. 3 may be separated from *B. quiscapata* by means of the narrower pedipalp chela of the male, the length/width ratio of which varies from 4.8 to 5.09, compared with *B. quiscapata*, in which it varies from 3.7 to 3.9.

Brachistosternus quiscapata is also related to *B. montanus*, from the central Andes of Argentina. Both species possess similar hemispermatophores, androvestigia, and telson glands, and the VM carina extends the full length of metasomal segment V. The pigmentation pattern of the two species is similar, but *B. quiscapata* may be distinguished because the VM stripe joins the VL stripes in all metasomal segments whereas in *B. montanus*, the VM and VL stripes join in segments IV and V only.

DISTRIBUTION: This species occurs on the Andean slopes of the Tarapacá Region, northern Chile, and the Tacna Department, southern Perú, between 3000 and 3400 m (fig. 72). The localities where it has been collected occur in the Serrania Esteparia ecoregion (Brack, 1986) and the Estepa Alto-Andina botanical region (Gajardo, 1993).

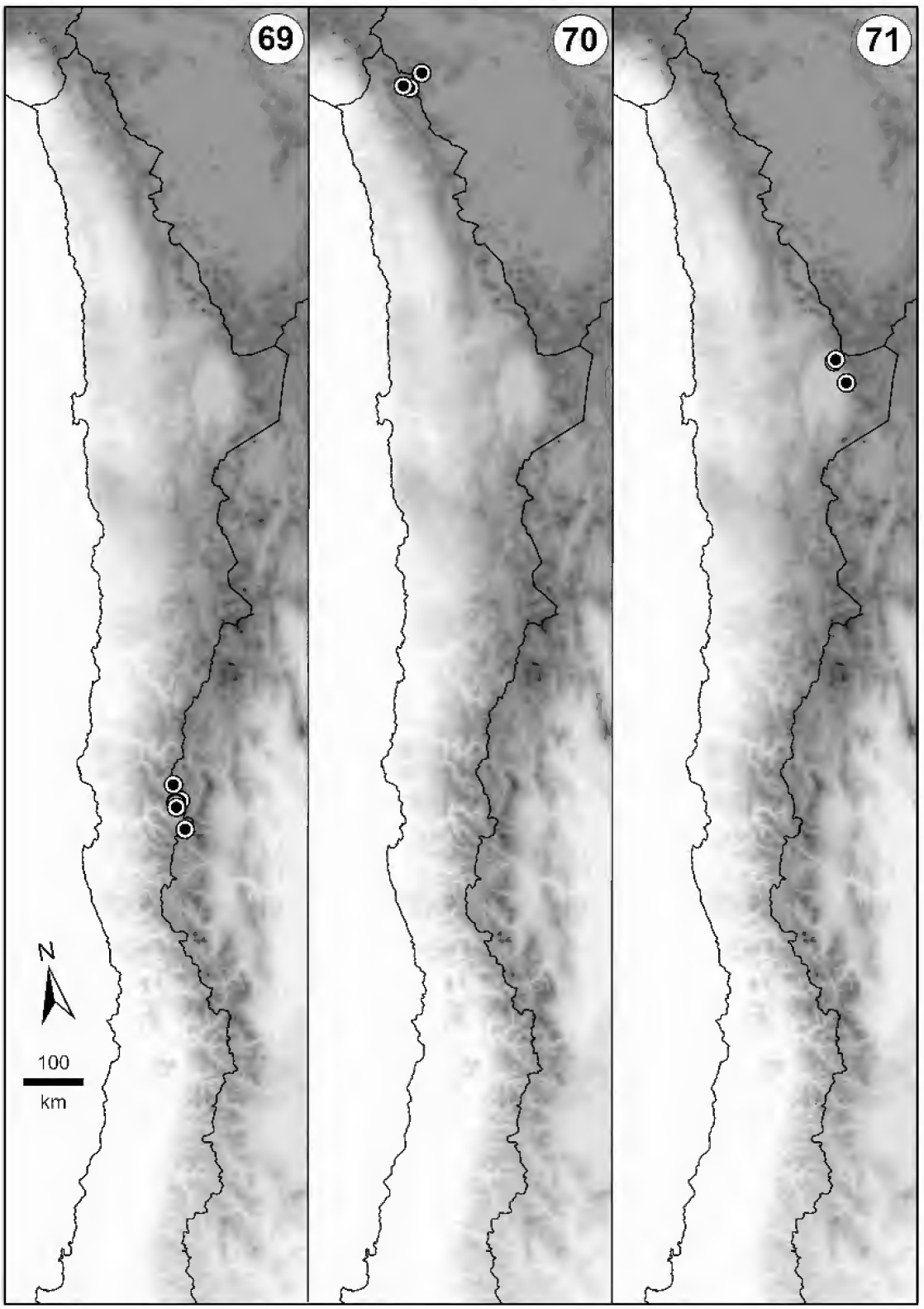
Brachistosternus (*L.*) *roigalsinai* Ojanguren Affilastro, 2002
figures 37, 73

Brachistosternus (*L.*) *roigalsinai* Ojanguren Affilastro, 2002b: 37–46; Ojanguren Affilastro, 2004b: 70, 72, 74, 2005a: 183.
Brachistosternus roigalsinai: Ojanguren Affilastro, 2005a: 191.

TYPE MATERIAL: Holotype ♂ (MACN-Ar 10239), **CHILE: Region IV (Coquimbo):** *Elqui Province*: Llano de La Higuera, 29°30′S 71°17′W, 11.x.1983, L. Peña.

NEW RECORDS: **CHILE: Region III (Atacama):** *Chañaral Province*: Parque Nacional Pan de Azúcar, near Chañaral: Agua Salada, in Quebrada Pan de Azúcar, 26°08′23.2″S 70°37′48.11″W, 9.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 82 m, UV detection on cool, still night, moon completely obscured by clouds, Atacama desert with steep scree slopes and alluvial flats at the base, specimen at base of rocky slope, 1♀ (AMCC 159681). Parque Nacional Pan de Azúcar: Mirador, 26°06′53.4″S 70°38′21.9″W, 23.i.2005, UV, A. Ojanguren and C. Mattoni, 262 m, 1 juv. (CDA), 1 juv. (MACN), 2 juv. (AMNH); Parque Nacional Pan de Azúcar: Sector Las Lomitas, 26°00′32.6″S 70°36′26.2″W, 833 m, "lomas" formation, wet, with fog, 24.i.2005, C. Mattoni and A. Ojanguren, 2 juv. (AMNH), 1 juv. (CDA). *Huasco Province*: La Herradura, W of Parque Nacional Llanos de Challe, 28°06′02″S 71°09′15.5″W, 10.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 35 m, UV detection on cool, dark, breezy night, very humid near beach, coastal sand flats, rocky hill and soils of intermediate hardness between, arid matorral with cacti and other succulents, 5 juv. (AMCC 159682); Parque Nacional Llanos de Challe, 5.5 km from Administration building, 28°06′56.13″S 71°05′55.41″W, 10.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 65 m, UV detection on cool, breezy night, moon not yet risen, steep scree slope with cacti and bushes, specimen on sandy loam ground at base of slope, 1 juv. (AMCC 159683), 1 juv. (CDA); Parque Nacional Llanos de Challe, Cerro Negro, 28°44′16.4″S 71°06′07″W, 25.i.2005, UV, Ojanguren and Mattoni, 2 juv. (MACN); Parque Nacional Llanos de Challe, plains on road to Cerro Negro, 28°11′16.4″S 71°06′06.7″W, 303 m, UV, full moon, 25.i.2005, C. Mattoni, A. Ojanguren, 1♀, 1 juv. (AMNH), 1♀ (CDA). Parque Nacional Llanos de Challe, Administration building, 28°09′39.8″S 71°03′20″W, 25.i.2005, A. Ojanguren and C. Mattoni, 1♂, 1 juv. (MACN). **Region IV (Coquimbo):** *Elqui Province*: Punta Teatinos, ca. 10 km N La Serena, 29°49′20.28″S 71°17′23.49″W, 7.xi.2003, J. Ochoa, C. Mattoni, and L. Prendini, 0 m, UV detection, cool, still night, full moon, high humidity near beach, rocky hill near beach, comprising granite boulders with sandy loam soil, Matorral vegetation, 1♀ (AMCC 159684), 1 juv. (AMCC 159680).

DIAGNOSIS: *Brachistosternus roigalsinai* is most closely related to *B. ehrenbergii*. The VM carina extends the full length of metasomal segment V and is more strongly developed in both species than in other Chilean species of *Brachistosternus*. Both species possess similar



Figs. 69–71. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **69**. *Brachistosternus perettii* Ojanguren Affilastro and Mattoni, 2006. **70**. *Brachistosternus piacentinii* Ojanguren Affilastro, 2003. **71**. *Brachistosternus prendinii* Ojanguren Affilastro, 2003.

hemispermatophores, the distal lamina of which is almost straight (figs. 36, 37), but narrow medially and lobate apically, the basal triangle is very elongated (more developed in *B. ehrenbergii*), the internal spines absent, and the basal spines and row of spines (usually branched), well developed. Both species also display a very well-developed distal lobe, but this is more elongated in *B. roigalsinai* than in *B. ehrenbergii*. The cylindrical apophysis is more strongly developed in the two species than in other species of the genus but is dorsoventrally flattened in *B. ehrenbergii* (fig. 36) and cylindrical in *B. roigalsinai* (fig. 37).

Brachistosternus roigalsinai and *B. ehrenbergii* may be separated according to the number of trichobothria on the ventral surface of the pedipalp patella: *B. ehrenbergii* possesses five to seven trichobothria, whereas *B. roigalsinai* possesses only three. The two species may be further distinguished according to the size of the androvestigia, which are very large, occupying almost the entire dorsal surface of metasomal segment V in *B. roigalsinai*, compared with *B. ehrenbergii*, in which they are medium-sized.

Brachistosternus roigalsinai is also related to *B. chango*. Both species display the largest androvestigia in the genus, occupying almost the entire surface of metasomal segment V (fig. 4). The two species may be distinguished according to the setation of the pedipalp femur: *B. roigalsinai* possesses a single macroseta associated with the *d* and *e* trichobothria of the pedipalp femur, whereas *B. chango* possesses two macrosetae (fig. 8). Both species may also be distinguished by means of the pigmentation pattern of the metasoma: *B. chango* displays paired VSM and VL stripes on the ventral surface of metasomal segments I–IV, but these segments are unpigmented or display a faint VM and paired VL stripes on metasomal segments III and IV only, in *B. roigalsinai*.

Brachistosternus roigalsinai may be distinguished from all other *Brachistosternus* by the very elongated distal lobe of the hemispermatophore (fig. 37), which is much longer than the distal lobe of the hemispermatophore of other species (figs. 1, 28, 38, 39).

Distribution: This species, which inhabits the plains of southern Antofagasta, Atacama, and northern Coquimbo regions (fig. 73), is one of the most widely distributed *Brachistosternus* species in Chile (Ojanguren Affilastro, 2002b, 2005a). All localities where it has been collected occur in the Desierto Costero botanical subregion of the Desierto botanical region.

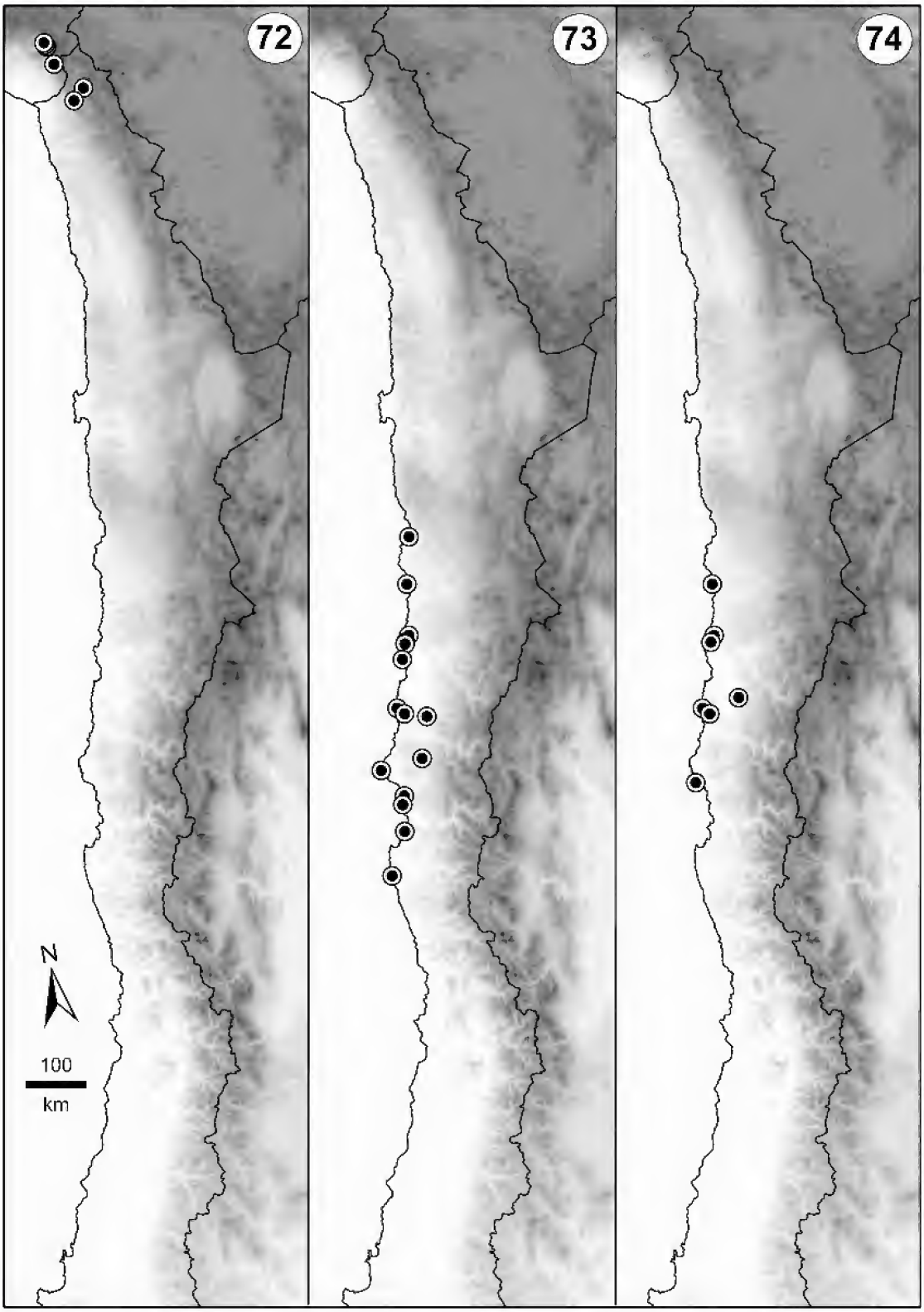
Brachistosternus (*L.*) *sciosciae* Ojanguren Affilastro, 2002
figures 38, 74

Brachistosternus (*L.*) *sciosciae* Ojanguren Affilastro, 2002b: 37–46, 2004b: 72, 2005a: 183.
Brachistosternus sciosciae: Ojanguren Affilastro, 2005a: 191.

Type Material: Holotype ♂ (MACN-Ar 10237), **CHILE: Region III (Atacama):** *Copiapó Province*: Caldera [27°04′S 70°17′W], 4.x.1983, E. Maury.

New Records: **CHILE: Region III (Atacama):** *Copiapó Province*: Los Sapos, 2 km from turnoff to Cerro Blanco from road Vallenar–Copiapó (Km 729 on Route 5), 28°01′25.19″S 70°33′06.36″W, 8.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 532 m, UV detection, cool, still night, full moon eclipsed, start of Atacama desert, bare sandy ground with occasional shrubs against low, rocky hills, becoming harder upslope, specimens on soft sand against hills, syntopic with *Bothriurus dumayi*, *B. kamanchaca* collected nearby on harder ground, 5♀ (CDA), 1♂, 18♀ (AMNH), 21 juv. (AMCC 159686). *Huasco Province*: La Herradura, W of Parque Nacional Llanos de Challe, 28°06′02.02″S 71°09′15.29″W, 10.xi.2003, L. Prendini, C. Mattoni, and J. Ochoa, 35 m, UV detection on cool, dark, breezy night, very humid near beach, coastal sand flats, rocky hill and soils of intermediate hardness between, arid Matorral with cacti and other succulents, specimens on soft sandy ground, *Bothriurus dumayi*, *B. kamanchaca*, *B. roigalsinai*, and *Caraboctonus keyserlingi* collected nearby on harder, rocky ground, 16♀, 18 juv. (CDA), 15♀, 1 juv. (AMNH), 82 juv. (AMCC 159685).

Diagnosis: *Brachistosternus sciosciae* may be distinguished from all other *Brachistosternus* species by the absence of androvestigia, which are present in all other species of



Figs. 72–74. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **72**. *Brachistosternus quiscapata* Ochoa and Acosta, 2002. **73**. *Brachistosternus roigalsinai* Ojanguren Affilastro, 2002. **74**. *Brachistosternus sciosciae* Ojanguren Affilastro, 2002.

the genus. *Brachistosternus sciosciae* is most closely related to an undescribed species from central Chile (referred to here as *Brachistosternus* sp. 1). The two species may be separated from other *Brachistosternus* species by the weak development of the internal structures of their hemispermatophores: The internal spines, basal spines, and row of spines are absent, and the basal triangle vestigial, that is, reduced to a small, smooth bulge without crests or spines, in both species. The two species are small in size (on average less than 40 mm in total length) and usually almost completely unpigmented. The inner unguis of telotarsi I and II is almost 15% longer than the external unguis, and the internal pedal spur of telotarsi I and II is vestigial or absent. The pedipalps and metasoma of both species exhibit poorly developed carinae, and the telson is slightly compressed dorsoventrally, especially in males.

The two species may be separated from one another by the presence, in *Brachistosternus* sp. 1, of small androvestigia, which are absent in *B. sciosciae*. The two species may be further distinguished as follows: The distal lamina of the hemispermatophore is curved medially in *Brachistosternus* sp. 1 (fig. 39) but almost straight, and slightly curved distally, in *B. sciosciae* (fig. 38); the VM carina of metasomal segment V extends the entire length of the segment in *Brachistosternus* sp. 1, but is restricted to the second half of the segment in *B. sciosciae*.

Distribution: This species inhabits the Atacama Region of northern Chile (fig. 74). All localities where it has been collected occur in the Desierto Costero botanical subregion of the Desierto Botanical region (Gajardo, 1993). Although this species was previously known only from coastal localities (Ojanguren Affilastro, 2002b, 2005a), a population was recently discovered in sympatry with *B. kamanchaca*, n.sp. at Los Sapos, almost 100 km inland.

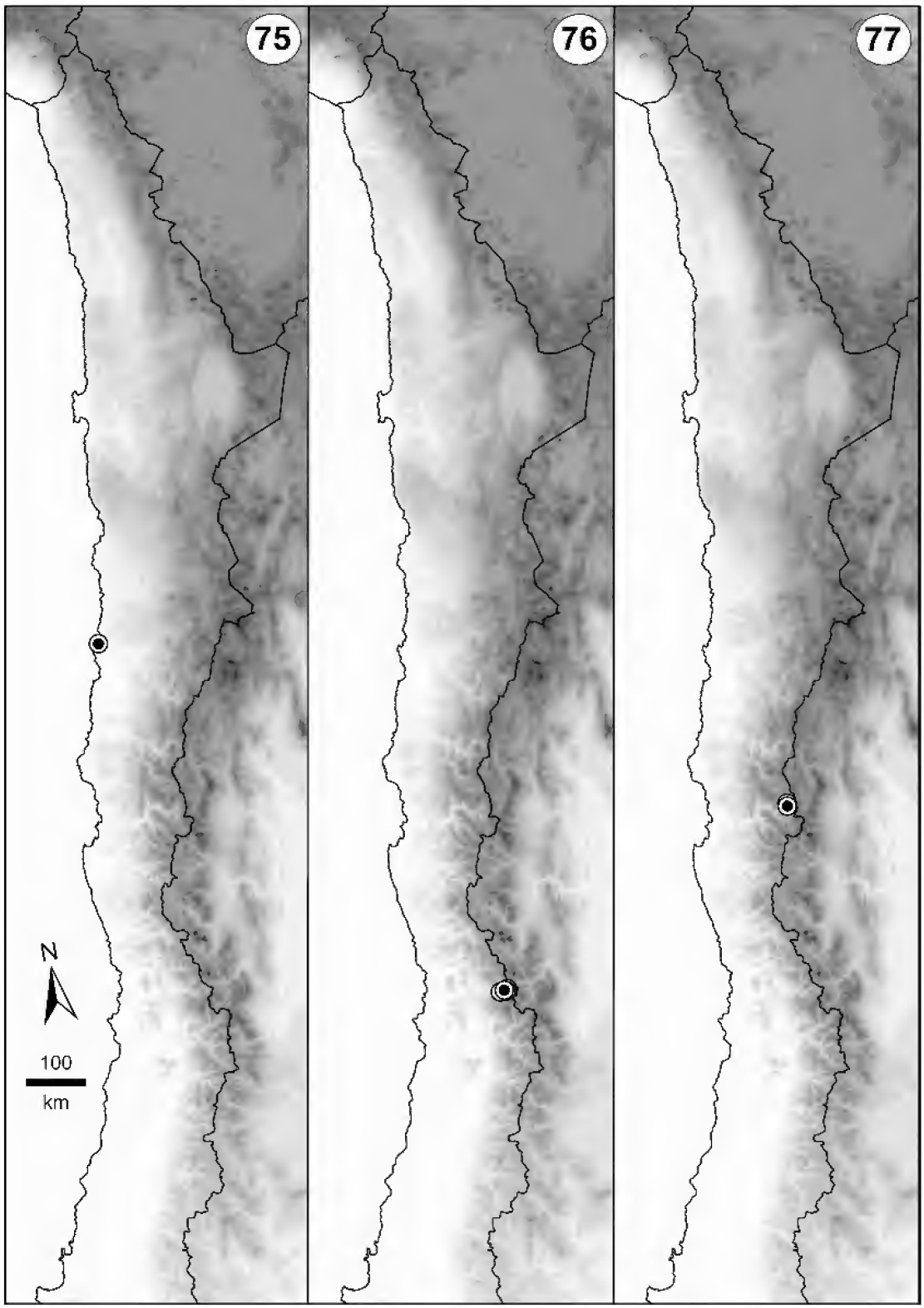
Notes: The specimens from Los Sapos are remarkable in possessing a brownish coloration with faint dark spots, quite different from "typical" specimens, which are completely unpigmented, with a pale yellow color. This difference in pigmentation is presumably related to differences in the color of the substratum inhabited by these scorpions, which is slightly darker at Los Sapos than at the coastal localities where this species was collected previously.

Brachistosternus (*L.*) sp. 1
figures 39, 52, 75

Material Examined: **CHILE: Region IV (Coquimbo):** *Elqui Province*: 5 km from Punta Choros, near the road to Choros, 29°14′29.0″S 71°25′45.9″W, 22.ii.2006, A.A. Ojanguren Affilastro, L. Compagnucci, and A.C. Cuezzo, 12 m, UV sampling, in dunes, syntopic with *B. roigalsinai*, 25♂, 5♀, 4 juv. (MACN-Ar); Choros, 29°17′10.3″S 71°19′7.2″W, 22.ii.2006, A.A. Ojanguren Affilastro, L. Compagnucci, and A.C. Cuezzo, UV sampling, in dunes with some shrubs, syntopic with *B. roigalsinai*, and *B. coriaceus*, 1♂ (MACN-Ar).

Diagnosis: *Brachistosternus* sp. 1 is closely related to *B. sciosciae*. Both species are small in size (less than 40 mm on average) and almost completely unpigmented. The inner unguis of telotarsi I and II is approximately 15% longer than the external unguis, and the internal pedal spur of telotarsi I and II is vestigial or absent in both species (fig. 52). The pedipalpal and metasomal carinae are weakly developed in these species, and the telson slightly compressed dorsoventrally (especially in males). Furthermore, the internal spines, basal spines, and row of spines of the hemispermatophore are absent, and the basal triangle vestigial, reduced to a small smooth bulge without crests or spines, in both species.

The two species may be distinguished by the presence, in *Brachistosternus* sp. 1, of small androvestigia, which are absent in *B. sciosciae*. Both species may also be distinguished according to the following characters. In *Brachistosternus* sp. 1, the distal lamina of the hemispermatophore is curved medially (fig. 39), whereas in *B. sciosciae*, it is almost straight and only slightly curved distally (fig. 38). The VM carina of metasomal segment V extends the entire length of the segment in *Brachistosternus* sp. 1, but is restricted to the second half of the segment in *B. sciosciae*.



Figs. 75–77. The known distributions of *Brachistosternus* Pocock, 1893 in central-northern Chile (contour interval 500 m). **75**. *Brachistosternus* sp. 1. **76**. *Brachistosternus* sp. 2. **77**. *Brachistosternus* sp. 3.

DISTRIBUTION: *Brachistosternus* sp. 1 has only been collected in coastal dunes near Punta Choros in Coquimbo region, Chile (fig. 75). These localities fall within the Desierto Costero del Huasco botanical subregion of the Desierto botanical region (Gajardo, 1993).

NOTES: A description of this species is in preparation by Jaime Pizarro, Pablo Agusto, and the first two authors.

Brachistosternus (*L.*) sp. 2
figures 44, 55, 76

MATERIAL EXAMINED: CHILE: Region V (Valparaiso): *Los Andes Province*: between Río Blanco and Juncal [32°54′S 70°11′W], 6.i.1984, A. Roig Alsina, 1950 m, 1♂ (MACN-Ar 10767); Guardia Vieja [32°54′S 70°17′W], 19.i.1984, E. Maury, 1600 m, 1♀, 1 juv. (MACN-Ar 10768); Juncal [32°52′S 70°10′W], 5.i.1984, E. Maury, 1950 m, 3♀, 3 juv. (MACN-Ar 10769); 20 km from Portezuelo [32°53′S 70°13′W], 13.ii.2005, Ojanguren and Korob, 2100 m, 1 juv. (MACN-Ar 10770).

DIAGNOSIS: *Brachistosternus* sp. 2 is closely related to *B. chilensis*. Both species possess similar hemispermatophores, in which the distal lamina is shorter than or equal to the basal portion, the internal spines are absent, the basal spines well developed, the row of spines unbranched, and the basal triangle medium-sized. The pigmentation pattern of the tergites is also similar, displaying two well-developed spots laterally and a small spot medially that is often absent. Telson glands are absent in both species.

The two species may be separated by means of pigmentation pattern. In *B. chilensis*, the VM stripe on metasomal segments I–IV is narrow and does not join the VL stripes (fig. 56), whereas in *Brachistosternus* sp. 2, it is broad and joins the VL stripes (fig. 55). Additionally, *B. chilensis* exhibits a well-developed VM carina on metasomal segment V, which is absent in *Brachistosternus* sp. 2 (fig. 44).

DISTRIBUTION: *Brachistosternus* sp. 2 is the southernmost Andean species in Chile. It has been collected at intermediate altitudes (1600–2100 m) in the central Andes of the Valparaiso region (fig. 76). These localities belong to the Andes Mediterraneos botanical subregion, of the Estepa altoandina botanical region (Gajardo, 1993).

NOTES: A description of this species is in preparation by the first author and Cristina Scioscia.

Brachistosternus (*L.*) sp. 3
figures 41, 51, 77

MATERIAL EXAMINED: **CHILE: Region IV (Coquimbo):** *Elqui Province*: between Juntas and Paso del Agua Negra [30°14′S 70°02′W], 6.iii.2006, A.A. Ojanguren Affilastro, L. Compagnucci, and A.C. Cuezzo, 3200 m, UV sampling, syntopic with *B. perettii* and an undescribed species of *Orobothriurus*, 5♂ (MACN-Ar); 2 km to entrance to "El Indio" gold mine [29°54′S 70°03′W], 26.ii.2004, 2850 m, UV sampling, C.I. Mattoni, J.A. Ochoa, and J. Pizarro Araya, 1 juv. (CDA); Cancha Sky, "El Indio" gold mine [29°51′S 70°03′W], ii.1992, Vasquez, 3300 m, under stones, 1♂ (LEULS); Sancarron, "El Indio" gold mine [29°45′S 70°00′W], ii.1993, J. Cepeda-Pizarro, 3200 m, pitfall, syntopic with *B. perettii*, 1 juv. (LEULS).

DIAGNOSIS: *Brachistosternus* sp. 3 is closely related to *B. montanus*, which occurs at the same latitude and in similar habitats on the eastern slopes of the Andes, in Argentina. Both species possess similar hemispermatophores, in which the distal lamina is slightly curved, medium-sized, and similar in length to the basal portion, the internal spines are absent, the basal spines and row of spines well developed, and the basal triangle weakly developed (fig. 41). The two species also exhibit a well-developed telson gland (fig. 51), similar, medium-sized androvestigia, and a VM carina extending the entire length of metasomal segment V. Both species display a similar pigmentation pattern in which the carapace is almost completely pigmented, the tergites possess a broad transverse stripe or three dark spots, connected by dense reticulate pigmentation, and a single VM and paired VL stripes on metasomal segments I–V.

The two species may be distinguished as follows. The VM stripe of metasomal segments I–IV is broad and faint, joining the VL

stripes in all segments of *Brachistosternus* sp. 3, but narrower, more densely pigmented, and does not join the VL stripes in segments I–III, in *B. montanus*. Both species may also be distinguished by the dimensions of the pedipalp chela of the male (the female of *Brachistosternus* sp. 3 is presently unknown). *Brachistosternus* sp. 3 exhibits a narrower pedipalp chela, with a length/width ratio of 4.8–5.09, whereas the chela of *B. montanus* is broader, varying from 4.01 to 4.37.

Brachistosternus sp. 3 is sympatric with *B. perettii*, which may be distinguished by the absence of a VM carina on metasomal segment V, and a telson gland divided into two separate halves (fig. 50). *Brachistosternus* sp. 3 exhibits a well-developed VM carina, extending the entire length of metasomal segment V, and the telson gland is entire (fig. 51).

DISTRIBUTION: *Brachistosternus* sp. 3 has been collected in the Central Andes of Coquimbo, Chile (fig. 77), between 2850 and 3300 m. The localities where it has been collected fall within the Andes Mediterraneos botanical subregion of the Desierto Florido botanical region (Gajardo, 1993).

NOTES: A description of this species is in preparation by Jaime Pizarro, Pablo Agusto, and the first two authors.

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